Understanding offending behaviours and the autism spectrum

Payne, Katy-Louise

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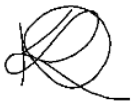


Declaration of authorship

I am the author of this thesis, and the work described therein was carried out by myself personally, with the exception of in Chapters Two, Three, Four and Five whereby the breakdown of work that was carried out by other researchers is as described below:

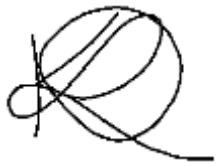
Formulation of ideas: Predominantly executed (90%).

Design of methodology: Predominantly executed (90%)

Experimental work: Predominantly executed (95%)

Presentation of data in journal format: Predominantly executed (90%)

Throughout my PhD, I received ongoing support from my supervisors regarding the research projects, hence the 90% scores for the formulation of ideas, design of methodology and presentation of data in journal format sections. Regarding the 95% for the experimental work, my ethical approval stipulated that I was unable to contact the offenders directly but rather had to go through a gate keeper who was able to identify offenders who met the study inclusion criteria, provide them with the study information sheet and then if the offenders were willing to participate a time and date for study participation were arranged through liaising with the gatekeeper.



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Firstly, I would like to really thank my supervisors for their unwavering support, advice and guidance throughout my PhD, without which my PhD journey would have been a lot less fulfilling and enjoyable and a lot more stressful!

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Abstract

This PhD thesis aimed to improve understanding of the characteristics and motivations of offenders across the autism spectrum. The offenders included within Chapters Two to Four committed traditional offences (e.g., assault, rape, shoplifting, criminal damage) and were diagnosed with Autism Spectrum Disorder (ASD), whereas Chapter Five addressed the hypothesised link between autistic traits and cyber-dependent offending (e.g., hacking). Using a mixed methods design, the thesis sought to both quantify where group differences lie and to understand the individual's self-reported offending motivations.

Chapter One (Introduction) provides an introduction to the thesis through a review of the theories of ASD and the autistic offender literature. Previous research suggests that autistic offenders commit more crimes against the person (e.g., assault, sexual crimes) than property offences, and whilst it is suggested that group differences may exist between offending and autistic groups, further research is required to address the methodological limitations of previous research (e.g., large, matched groups). Chapter Two empirically examines whether factors associated with offending in typically developed offenders are also present in autistic offenders. Chapter Three investigates whether autistic offenders typically offend alone or with others and the associated predictors of this (e.g., social vulnerability, compliance). Sexual offending was one of the most common autistic offences, and Chapter Four qualitatively investigates the self-reported motivations of autistic sexual offenders.

High profile cases (e.g., Gary McKinnon) and anecdotal evidence from law enforcement highlighted a potential link between ASD and cyber-dependent offending (i.e., offending that cannot be committed without a computer), yet there is a paucity of empirical research to refute or support this notion. Chapter Five addresses this deficit in two ways: (1) by assessing autistic traits and cyber-deviant behaviour and; (2) identifying reasons for engaging or desisting from cyber-dependent deviancy. The discussion (Chapter Six)

interprets and discusses the findings with reference to applicable theory and practical implications, before discussing the limitations and avenues for future research.

1. General introduction

1.1 Overview of Chapter One

Since first described by Kanner in 1943, there has been an increasing body of literature around autism spectrum disorder (ASD), with growing academic and applied interest in understanding offending behaviours across the autism spectrum. Whilst estimates indicate an increased prevalence of ASD of approximately 4.5% (Fazio, Pietz, & Denney, 2012; National Autistic Society, 2017; Robinson et al., 2012) in the criminal justice system, the autistic offender literature is still in its relative infancy compared to the typically developed (TD) offending literature. This is despite a marked increase in ASD research more broadly. Damiano, Mazefsky, White, and Dichter (2013) report a 325% increase in ASD publications from 2003 to 2013. This chapter firstly aims to provide an overview of what ASD is and the difficulties that individuals with the disorder may face, before presenting the prominent theories and more recent theoretical developments to explain these differences. The purpose of this is to contextualise the findings of the current thesis (e.g., to introduce the idea of Theory of Mind and its relationship to offending). The second aim of this chapter is to present and discuss the existing autistic offender literature to explain what is currently known about this group of offenders. The review discusses the prevalence of ASD within the Criminal Justice System (CJS), types of crimes committed, the reported characteristics of autistic offenders (e.g., education, psychiatric comorbidity, and childhood) and the currently understood reasons for autistic individuals engaging in offending. Finally, the literature discusses an offender's journey through the CJS from their own first-hand experiences.

Chapter one firstly aims to provide an overview of what ASD is and the difficulties that individuals with the disorder may face, before presenting the prominent cognitive theories and more recent theoretical developments to explain these differences. The

prominent cognitive theories to be discussed are Theory of Mind (ToM), Executive Functioning (EF) and Weak Central Coherence (WCC). These theories were chosen as they are considered by research to be the most prominent cognitive theories of autism that have direct relevance for real life behaviours such as offending (Brunsdon & Happé, 2014; Frith, 2012, Rajendran & Mitchell, 2007). The purpose of this is to contextualise the findings of the current thesis (e.g., to introduce the idea of Theory of Mind and its relationship to offending). The second aim of this chapter is to present and discuss the existing autistic offender literature to explain what is currently known about this group of offenders. The review discusses the prevalence of ASD within the Criminal Justice System (CJS), types of crimes committed, the reported characteristics of autistic offenders (e.g., education, psychiatric comorbidity, and childhood) and the currently understood reasons for autistic individuals engaging in offending. Finally, the literature discusses an offender's journey through the CJS from their own first-hand experiences.

1.2 Autism spectrum disorder

Autism was first described by Kanner (1943) when he described the cases of eleven children who visited his clinic in Baltimore. He described individuals who demonstrated a desire for aloneness and sameness who engaged in repetitive behaviours to help ensure this. He described a delay in language such that at around 5-6 years the children progressed from echolalia to the use of personal pronouns (Kanner, 1943) whereas for TD children, by age three, they are using complex sentences (e.g., the lorry I got was a blue one; Smith, Cowie, & Blade, 2011). At around the same time Hans Asperger (1944) wrote a paper which formed the basis of what is now known to be Asperger syndrome. The paper did not reach wider audiences until it was translated from German to English by Frith in 1991. Asperger described four children with "autistic psychopathy". These children demonstrated similar

difficulties to those described by Kanner (1943) apart from they did not demonstrate the same delay/difficulties with language described by Kanner (1943).

Today, autism spectrum disorder (ASD) is described as a neurodevelopmental disorder diagnosed using the Diagnostic Statistical Manual 5 (DSM 5; American Psychiatric Association, 2013) or the International Classification of Diseases 11 (ICD 11; World Health Organisation, 2018). Both manuals now view the disorder as a spectrum rather than viewing the disorder as categorical sub-diagnoses (e.g., autism, Asperger's syndrome) as previous editions had done. The disorder is characterised by persistent deficits in social communication and interaction coupled with restricted/repetitive patterns of behaviour, interests or activities, with the onset occurring during early childhood (American Psychiatric Association, 2013; World Health Organisation, 2018). Despite childhood onset, symptoms may not become apparent until the social demands exceed the individual's capabilities. ASD affects all areas of functioning including but not restricted to personal, family, social, educational and occupational although the observation of difficulties may vary depending on context (American Psychiatric Association, 2013; World Health Organisation).

The prevalence of ASD within the UK is estimated to be approximately 1% (Baird et al., 2006; Brugha et al., 2011) with the most recent meta analytical data estimating that the male to female ratio is around 3:1 (Loomes, Hull, & Mandy, 2017). There are many proposed reasons for this gender imbalance, including the notion that there is a subtle but distinct female phenotype of autism which is not effectively captured using existing diagnostic tools (Dworzynski, Ronald, Bolton, & Happé, 2012; Lai, Lombardo, Auyeung, Chakrabarti, & Baron-Cohen, 2015; van Wijngaarden-Cremers et al., 2014) or that females may be better than males at masking their difficulties (Baldwin & Costley, 2016; Bargiela, Steward, & Mady, 2016; Cridland, Jones, Caputi, & Magee, 2014). The focus of this thesis, however, is predominantly on male offenders for two main practical reasons: (1) females comprise only

5% of the UK prison population (Sturge, 2018); (2) higher numbers of males are diagnosed with ASD (Loomes et al., 2017).

ASD has been proposed to reside at the end of a continuum of autistic traits. Autistic traits are distributed across the population as a whole. Typically autistic traits are higher in males than females and highest overall in autistic people (with no sex differences in autistic traits within ASD samples) (Ruzich et al., 2015). Autistic traits are measured by self-report questionnaires such as the Autism Spectrum Quotient (AQ: Baron-Cohen et al., 2001). Items on the AQ include 'I would rather go to a library than a party', 'I am fascinated by numbers', 'I find it hard to make new friends'. People with high levels of autistic traits are very similar on this measure, whether or not they have a diagnosis of ASD (Lundqvist & Lindner, 2017), suggesting an overlapping genetic and biological etiology underlying autism and autistic traits (Bralten et al., 2018). This will be discussed in greater depth within the theories of ASD section below.

1.3 Theories of ASD

The dominant view of ASD in the 1960s was that ASD was caused by environmental factors. Bettelheim (1967) proposed the Refrigerator Mother theory which stated that autism developed as a response to an unaffectionate maternal relationship. The treatment given – and later found to be ineffective – was to remove the child from the parents and place them with a foster family where it was hoped that the child's social development would recover. Initially biological and genetic factors were not considered, but Folstein and Rutter's (1977) work with monozygotic and dizygotic twins changed this with a reported 36% concordance rate for autism in monozygotic (MZ) twins and 0% in dizygotic (DZ) twins. More recent research which has reported higher concordance rates of 62% in MZ twins and 0% in DZ twins and when the broader autism phenotype was investigated, the convergent rates were 92% for MZ

twins and 0% for DZ twins (Bailey et al., 1995; see Rutter & Thapar, 2014, for a review). This demonstrates the role of genetics in ASD and we now know that genetics plays a significant role in the aetiology of ASD. Additionally, many environmental factors have been suggested across prenatal, perinatal and neonatal stages of development (e.g., exposure to intrauterine infections, umbilical cord complications, foetal distress, birth injury or trauma, maternal haemorrhage, exposure to medications such as valproate during pregnancy; see Chaste & Leboyer, 2012, Kim & Levanthal, 2015; Tjordman et al., 2014 for reviews), although no singular environmental factor has been identified. The environment can modify the expression of a gene and research supports the claim that genetic or environmental factors rarely act alone, together this suggests that ASD expression is resultant from a combination of both genetic and environmental factors (Chaste & Leboyer, 2012; Kim & Levanthal, 2015; Tordjman et al., 2014).

At the neuropsychological level, Hermelin and O'Connor's very early series of experiments demonstrated problems with abstraction whereby they found that the learning of autistic[1] children was less influenced by meaning (Hermelin & O'Connor, 1970) and these findings subsequently informed the research of Uta Frith. Various theories of ASD have been proposed but the Theory of Mind (ToM) account is the most relevant for this thesis. The other theories that will be briefly discussed later in this chapter are executive function (EF) and weak central coherence (WCC) as well as more recent theoretical approaches to ASD.

[1] Throughout this thesis, in line with research examining the views of the autistic and autism communities, I shall predominantly be using identity first language to refer to individuals diagnosed with ASD. Kenny et al. (2016) found that 'autistic' was the preferred term by many autistic individuals when asked to choose one term to describe themselves. However, I am respectful that this opinion was not unanimous within the autism community.

ToM, EF and WCC will be discussed alongside the pattern of findings within typically developed (TD)and autistic offender literature (where available).

1.3.1 Theory of Mind

Theory of mind (ToM) refers to the ability of an individual to ascribe mental states to both oneself and to others (Premack & Woodruff, 1978). Mental states include beliefs, desires, intentions, imagination and emotions which cause action (Baron-Cohen, 2001). ToM enables an individual to put oneself in another person's shoes to imagine how they are feeling and thinking in order to be able to make sense of and predict another person's behaviour (Baron-Cohen, 2008). ToM is not one uniform concept but rather there are three main levels an individual can acquire: (1) first order; (2) second order; and (3) advanced ToM. First order beliefs refer to describing what people think about real events (e.g., 'Michael thinks that the world is flat'). Second order beliefs refer to what people think about other peoples' thoughts (e.g., 'Sally thinks that John thinks the ball is under the blanket'), and advanced ToM refer to what people think other people think about their thoughts (e.g., knowing that it might be best to not say something to prevent hurting another person's feelings) (Perner & Wimmer, 1985).

ToM develops in typically developing (TD) children around the age of four years old (Wimmer & Perner, 1983) with children around this age being aware of others' minds and how they may differ in their beliefs. In autistic individuals, a seminal study by Baron-Cohen, Leslie, & Frith (1985) reported that when tested using the Sally-Anne test – a task requiring the attributing of a false belief to another person - autistic children (mean age = 11yrs 11 months) failed the first order ToM test significantly more often than both individuals with Down's syndrome and pre-school aged TD individuals (Baron-Cohen et al., 1985). This indicates an inability to represent mental states and suggests autistic individuals are thus disadvantaged in predicting other people's behaviour (Baron-Cohen et al., 1985). This

pivotal finding has since been widely replicated using other variants of the test (e.g., Ozonoff, Pennington & Rogers, 1991; Perner, Frith, Leslie & Leakham, 1989; Rajendran & Mitchell, 2007). While most autistic individuals are able to pass first and second order ToM (Bowler, 1992) by adulthood, they continue to have difficulties functioning in social settings (Ozonoff, Rogers, & Pennington. 1991b). Advanced ToM requires individuals to use subtle information to make sense of social situations (Spek, Scholte, & Van Berckelaer-Onnes, 2010). Given this thesis predominantly focuses on adults, the literature of adult performance on advanced ToM tests will now be presented.

The most frequently used measures of advanced ToM in research are the Strange Stories test (Happé, 1994), the Reading the Mind in the Eyes task (Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997; Revised: Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) and the Faux-Pas Test (Baron-Cohen, O'Riordan, Stone, Jones & Plaisted, 1999). The Strange Stories test (Happé, 1994) includes 24 vignettes/stories depicting everyday events which provide statements whereby the motivations behind the utterances are not literally true. Following each vignette there are two questions: one comprehension (e.g., 'was it true what X said') and one mental state justification (e.g., 'Why did X say that?'). The latter is used to evaluate ToM. Research indicates that autistic adults typically perform significantly worse than TD adults on this measure (Adler, Nadler, Eviatar, & Shamay-Tsoory, 2010; Crane, Goddard, & Pring, 2013; David et al., 2008; Joliffe & Baron-Cohen, 1999; Kirsten, Rossman, & Sodian, 2014; Podreño, Pousa, Navarro, Pàmias, & Obiols, 2017; Rogers, Dziobek, Hassanstab, Wolf, & Convit, 2007), however some research has found no significant differences in performance between autistic and TD participants (Couture et al., 2010; Murray et al., 2017; Schneider, Slaughter, Bayliss, & Dux, 2013; Schuwerk, Vuori, & Sodian, 2015; Spek et al., 2010; Wilson et al., 2014). A large mean effect size for the Strange Stories research was found (d = 0.88). Suggested reasons for the lack of significance between

ASD and TD individuals could include an inadequate sample size, a lack of standardisation in how the tests are applied or the language abilities of the individuals taking the test (Hughes & Leekam, 2004).

The second ToM measure commonly used is the Reading the Mind in the Eyes test-revised (Baron-Cohen et al., 2001) which involves showing participants photographs of the eye region of people's faces (midway along nose to just above the eyebrow) and asking participants to select from four adjectives the one which describes the mental state depicted in the photo. Research has typically found that autistic adults perform worse on this task than TD adults, purportedly indicating poorer ToM (Baron-Cohen et al., 2001; Baron-Cohen et al., 2015; Craig, Hatton, Craig, & Bentall, 2004; Kirchner, Hatri, Heekeren, & Dziobek, 2011; Kirsten et al., 2014; Kleinman, Marciano, & Ault, 2001; Losh et al., 2009; Podreño et al., 2017; Sato et al., 2017; Schuwerk et al., 2015; Schwartz, Bente, Gawronski, Schilbach, & Vogeley, 2010; Wilson et al., 2014; Woodbury-Smith et al., 2005). Despite a large effect size being found (d = 1.07), similarly to the Strange Stories, some research fails to find significant differences between autistic and TD individuals (Baez et al., 2012; Couture et al., 2010; Dratsch et al., 2013; Gonzalez-Gadea et al., 2013; Libero, Stevens Jr, & Kana., 2014; Spek et al., 2010). This could be due to a lack of adequate sample size, a lack of standardised application of the test or it may be that ToM deficits might not be ubiquitous in ASD.

Another test often used to assess ToM in adults, the Faux Pas Test (Baron-Cohen et al., 1999), presents participants with 10 stories involving two or three characters. Each story contains a faux pas (i.e., something that the actor says without considering that the participants may not wish to hear or know, which usually has an associated negative consequence that the actor had not intended). Following each story participants are asked four questions to assess comprehension, faux pas detection/identification and false belief detection/identification (Baron-Cohen et al., 1999). In contrast to findings on the Strange

Stories (Happé, 1994) and the Reading the Mind in the Eyes test (Baron-Cohen et al., 2001), research using the Faux Pas test reports similar findings across all adult studies, whereby autistic adults perform significantly worse that TD adults (Baez et al., 2012; Gonzalez-Gadea et al., 2013; Lever & Guerts, 2016; Podreño et al., 2017; Spek et al., 2010; Thie´baut et al., 2016; Zalla, Miele, Leboyer, & Metcalfe, 2015; Zalla, Sperduti, Girardi, Chelini, & Leboyer, 2016; Zalla & Leboyer, 2011; Zalla, Barlassina, Buon, & Leboyer, 2011; Zalla, Sav, Stopin, Ahade, & Leboyer, 2009) indicating poorer ability to detect a faux pas and overall poorer ToM. A very large mean effect size was found for this measure (d = 1.48) which could explain the lack of non-significant results; however, whilst this test appears to be the best option for differentiating ASD and TD participants there are concerns that the results do not fully capture the difficulties that autistic individuals experience. For example, some of the literature indicates that autistic individuals over-detect faux pas – believing there is a faux pas when one is not present (e.g., Zalla et al., 2009; Thie'balt et al, 2016), suggesting that the Faux Pas test may lack validity and identifying the need for further ToM test development.

ToM in TD offender populations has been shown to be impaired (Castellino, Bosco, Marshall, Marshall, & Veglia, 2011; Elsegood & Duff, 2010; Spenser, Betts, & Gupta, 2015), with small to moderate effect sizes (r = .21) reported between TD offenders and TD non-offenders on the Reading the Mind in the Eyes Test; however, the research on the ToM abilities of autistic offenders is more mixed (Chesterman & Rutter, 1993; Kohn, Fahum, Ratzoni, & Apter, 1998; Woodbury-Smith et al., 2005). Case study reports (Chesterman & Rutter, 1993; Kohn et al., 1998) indicate that autistic offenders may have ToM but are unable to apply it to the real world. However, empirical research using the Reading the Mind in the Eyes task (Baron-Cohen et al., 2001) found no significant differences between autistic offenders and TD non-offenders; indeed, unimpaired ToM was found to be associated with increased likelihood of belonging to the autistic offender group (Woodbury-Smith et al.,

2005). However, whilst the autistic offenders did not significantly differ to the TD non-offenders, they did demonstrate comparative deficits. Further autistic offender research is needed to clarify whether findings from non-offending autistic samples are ungeneralizable to autistic offenders or whether the differences between autistic offenders and autistic non-offenders are due to inconsistencies with the test.

One proposed explanation for the performance variability often observed on ToM tests is that autistic individuals are able to hack out the answer to the problem (i.e., approaching ToM tasks as a purely logical problem rather than understanding mental states to correctly answer tasks; Rajendran et al., 2007) on paper whereas they may struggle to when similar scenarios are experienced in real life (Frith, 2004). Tests also lack standardisation in application and there is a paucity of tests which have been psychometrically tested and evaluated with large samples (Brewer, Young & Barnet, 2017). Research has attempted to address the some of the previous concerns (i.e., lack of applicability to real life) by asking participants to watch video clips (rather than reading text or viewing photos) based in part on the scenarios on Happé's Strange Stories assessment (Happé, 1994). Both measures (Brewer et al., 2017; Murray et al., 2017) successfully differentiated ASD and TD adults (Brewer et al., 2017; Murray et al., 2017) suggesting that dynamic tests may be more effective at differentiating autistic and TD individuals. However, only Brewer et al's (2017) Adult Theory of Mind measure (A-ToM) attempts to prevent autistic individuals from hacking out the answer by providing a one-minute time restriction to answer the ToM-based questions. As well as limiting the potential for individuals to 'hack' out the answer, this also makes performance on the task more directly relatable to everyday scenarios.

The reduced ability to ascribe mental states and imagine how another person is feeling that is associated with ToM deficits may lead to reduced awareness of the impact of their behaviours on victims. While ToM is often associated with empathy (e.g., Cuff, Brown,

Taylor, & Howat, 2016; Gery, Miljkovitch, Berthoz, & Soussignan, 2009; Sharp & Vanwoerden, 2014), there is an important distinction to be made between impairments in resonating with others' emotions and difficulties in cognitive perspective taking. Empathy is a concept which includes both cognitive and affective components, with cognitive empathy referring to the ability to understand another person's perspective, and affective empathy referring to the emotional response to the affective state of another person (Davis, 1983). Research indicates that affective and cognitive empathy can differentiate autistic individuals from psychopaths (Lockwood, Bird, Bridge, & Viding, 2013). Specifically, autistic individuals have cognitive empathy deficits but largely intact affective empathy (Blair, 2005; Jones, Happé, Gilbert, Burnett, & Viding, 2010; Mazza et al., 2014; Rogers, Dziobek, Hassenstab, Wolf, & Convit, 2007; Rueda, Fernández, & Baron-Cohen, 2015) whereas psychopaths or those with increased psychopathic traits typically have intact cognitive empathy but lack affective empathy (Blair, 2005; Brouns et al., 2013; Jones et al., 2010; Pfabigan et al., 2015). Another proposed theory of autism is executive function. This will be discussed in detail below.

1.3.2. Executive Function

Executive function (EF) is an umbrella term referring to six functions including: (1) planning; (2) concept formation/set shifting; (3) mental flexibility; (4) fluency; (5) response inhibition; (6) working memory (Demetriou et al., 2018). A recent meta-analysis of data from 235 studies and 14,081 participants concluded that autistic individuals performed significantly worse than TD individuals across all six sub domains of executive function listed above (Demetriou et al., 2018). Typically, there were smaller effect sizes in the autistic adult groups compared to younger samples which may be reflective of developmental maturity or the development and use of compensatory/coping strategies (Demetriou et al.,

2018). For example, the Hedge's *g* effect sizes of mental flexibility, fluency, planning and working memory decreased by 0.12, 0.21, 0.31 and 0.22, respectively between childhood and adulthood (Demetriou et al., 2018).

As identified above, autistic non-offending individuals are reported to perform worse across all domains of EF which impacts negatively upon their daily life (Kenworthy, Yerys, Anothony, & Wallace, 2008). For example, planning deficits may lead to an inability to effectively coordinate your time or know when you should amend your plans because changes have occurred which mean that previously made plans are no longer feasible. Furthermore, working memory (WM) helps to facilitate this by enabling an individual to retain required information to inform choices and the generativity element of EF helps to create new ideas or solutions.

EF deficits may lead to offending due to impairments in any of the six functions or a combination of these and may differ depending on the offence type. For example, deficits in response inhibition may lead to an inability to inhibit a behaviour which leads to offending. Generally, EF deficits are frequently reported in the TD offender literature with executive functioning impairments demonstrated by TD offenders compared to TD non-offenders with a large mean effect size (d = .81; Baker & Ireland, 2007; Hancock, Tapscott, & Hoaken, 2010; Hoaken, Allaby, & Earle, 2006; Joyal, Beaulieu, & de Chantérac, 2014; Meijers, Harte, Meynen, & Cuijpers, 2017; Raine et al., 2012; Rodriguez, Boyce, & Hodges, 2017; Seruca & Silva, 2016).

Regarding offence specific deficits, research reports that violent offenders demonstrate poorer response inhibition (Hancock et al., 2010; Meijers et al., 2017), concept formation (Hancock et al., 2010), planning (Seruca & Silva, 2016) and cognitive flexibility (Hancock et al., 2010) compared to non-violent offenders. Literature comparing sexual and non-sexual offenders is mixed, with Rodriguez et al. (2017) reporting poorer EF in sexual

offenders than non-sexual offenders whereas Joyal et al. (2014) reporting no significant differences. Within the sexual offender groups, differences are reported between child sex offenders and those who offend against adults, whereby child sexual offenders have been found to demonstrate poorer concept formation and cognitive flexibility, but better verbal fluency and impulse control compared to adult sex offenders (Joyal et al., 2014). Finally, those engaging in white collar crimes (e.g., using computer illegally to gain money or information) have been reported to have significantly better executive functioning than non-white collar criminals, as measured using the Wisconsin Card Sorting Test (Raine et al., 2012). This finding could be explained by the high level of skill required to engage in this type of offending. Together these findings suggest that executive functioning abilities may influence the types of crime individuals engage in or their ability to engage with interventions and treatments.

To date, only one paper has looked at EF in autistic offenders and the findings are in contrast to those reported in the TD offender literature. Woodbury-Smith et al. (2005) found no significant differences between autistic offenders and both non-offender groups (ASD; TD) on the Behavioural Assessment of the Dysexecutive Syndrome (BADS) – an assessment including measures of planning, concept formation and mental flexibility. Both EF and ToM demonstrate similar patterns with deficits observed in both autistic non-offenders and TD offenders but not in autistic offenders, which may reflect differences but may also be associated with the inadequate power associated with autistic offender research.

1.3.3. Weak Central Coherence

Whilst the components of weak central coherence theory appeared in Kanner's original description of ASD (Kanner, 1943), whereby he described an attention to detail and an inability to view the whole, the weak central coherence (WCC) theory of autism was first

proposed by Frith (1989). Whereas TD individuals have a preference for processing information at a global level obtain meaning – often at the expense of attention or memory of the small details (i.e., local level), autistic individuals are proposed to have weak central coherence, with a processing style which preferences the constituent parts of incoming information and results in difficulties extracting the gist and seeing the bigger picture.

Within non-offending autistic populations an array of different tests have been used to assess WCC including the embedded figures test (Witkin, Oltman, Raskin, & Karp, 1971) and the homograph test (Frith & Snowling, 1983), with more recent research designing more novel methods to assess WCC (e.g., Booth & Happé, 2016). The majority of research reports that autistic adults have weak WCC (i.e., poorer global processing and better local processing) compared to TD individuals (Barnes & Baron-Cohen, 2012; Booth & Happé, 2016; Jolliffe & Baron-Cohen, 1997; 1999; 2001a; 2001b; 2001c; Kätsyri, Saalasti, Tiippana, von Wendt, & Sams, 2008; Losh et al., 2009; Shah & Frith, 1993). However, some research has found superior local processing without a global processing deficit in autistic adults (Bernadino et al., 2012; Maule, Stanworth, Pellicano, & Franklin, 2017), and that the local processing preference often reported in ASD could be replicated *if* the experimental conditions were manipulated to require this (Bernardino et al., 2012). Additionally, some research found no significant differences between autistic and TD individuals (Beaumont & Newcombe, 2006; Klin & Jones, 2006; Losh et al., 2009; Nakano, Kato, & Kitazawa, 2012; Wilson et al., 2014) possibly due to the simplicity of the task, small sample (Beaumont & Newcombe, 2006) or that the task used a different method (e.g., hepatic shape perception) to previous research (Nakano et al., 2012) highlighting the importance of assessing the validity of the tool being used.

WCC may help to explain offending behaviours as a result of the autistic individual having global processing deficits and a preference for local processing. WCC is often used to

account for the non-social issues associated with ASD. For example, if an autistic individual has a special interest (e.g., weapons) they may engage with this in various ways (e.g., online searches, purchases) but they may not see the global picture (e.g., the inappropriateness to discuss or actively participate in this at an airport) which may lead to the CJS being involved. To date, no research has experimentally tested weak central coherence in either TD or autistic offenders, although research has suggested a role of WCC deficits as a contributing factor to autistic offending (Higham, Pirachi, & Crocombe, 2016).

1.3.4. Recent theories of ASD

Studies that have looked at the relationship between ToM, EF and WCC in ASD have found the theories to be closely related (Brunsdon & Happé, 2014; Cantio et al., 2016; Jarrold, Butler, Cottington, and Jiminez, 2000; Pellicano, 2010). Through the use of longitudinal studies, Pellicano (2010) found that individual differences in early EF performance predicted ToM development beyond what would be expected by age, verbal and non-verbal ability as well as the child's initial ToM performance. However, an independent relationship was also found between early ToM performance and later executive control. WCC inversely predicted ToM performance (i.e., WCC resulted in poorer ToM), however ToM did not predict later WCC. Finally, no longitudinal links were found between EF and CC, suggesting that these two concepts may be distinct in autism. Later research suggests that the relationship between EF and ToM may be stronger than between ToM and WCC (Brunsdon & Happé, 2014). For example, Cantio et al. (2016) reported that whilst ToM and EF differentiated autistic and TD individuals few autistic individuals demonstrated WCC, and that when WCC was reported, this was not found to be related to ToM or EF. The idea of fractionation or the potential for no one single theory of autism or the core deficits of ASD is a concept presented by Happé, Ronald, and Plomin (2006) and is supported by Pellicano

(2010). In a review of the published literature, Happé et al. (2006) argue that no core deficit in ToM, EF and WCC can account for the full range of impairments associated with ASD (e.g., social difficulties, restricted and repetitive behaviours). They propose that research should focus on providing detailed accounts of each part of the triad (Happé et al., 2006).

Traditionally, ToM, EF and WCC were the 'big three' theories of ASD, however more recent theoretical developments have moved away from attempting to conceptualise ASD as a core deficit in one of these three areas. For example, predictive models currently in favour (e.g., Pellicano & Burr, 2012; Van de Cruys et al., 2014) argue that ASD is underpinned by a deficit (or difference) in the way predictions and errors about the world are processed – either as a reduced influence of prior knowledge (Pellicano & Burr, 2012) or overly high weight assigned to errors (Van de Cruys et al, 2014). These new models suggest that the core *difference* in ASD is in the *interpretation* of incoming information in the environment – that it is processed differently resulting in a tendency to perceive the world more accurately rather than modulated by prior experience. We are constantly making and updating predictions about the world based on past experiences. Sometimes errors are important, and we need to take note of them in order to feedback into updating how we process the world; however at other times our prediction errors are irrelevant and we need to ignore them. If this process of generating predictions and/or assigning importance to errors is faulty, for example, if almost every error in the environment is attended to (Van de Cruys et al. 2014) it makes life very difficult, and uncomfortable (e.g., to flexibly adapt to new situations). Differences in interpreting and understanding everyday situations may lead to a number of difficulties including incidents which lead to contact with the CJS (e.g., as victim, offender). This will now be discussed.

1.4 Autism and the Criminal Justice System

Autistic individuals may come into contact with the Criminal Justice System (CJS) as a victim, witness, suspect and/or offender. This section will briefly outline the victim and witness literature since autistic witnesses and victims can also become suspects and offenders (Mandell, Walrath, Mantueffel, Sgro, & Pinto-Martin, 2005; Ray, Marks, & Bray-Garretson, 2004) thus sometimes share similar underlying risk factors, but, as the focus of this thesis is on offenders, the focus is predominantly on the offender literature. Within the UK, the criminal process typically starts with an offence being committed and reported to the police. The police will then investigate the report during which individuals will likely be interviewed before being charged with the offence if the Crown Prosecution Service believes that there is sufficient evidence to secure a conviction. Following this the individual is released on bail or remanded in custody pending trial. Upon completion of the trial, if found guilty an individual is sentenced (Clinks, 2012).

1.4.1. Autistic victims and witnesses

To date, studies looking at autistic adults as victims of crime are relatively scarce, although research suggests that autistic individuals may be vulnerable to becoming victims of crime (e.g., disability hate crime, bullying, assault, sexual abuse, anti-social behaviour and theft; Archer & Hurley, 2013; Brown-Lavoie, Viecili, & Weiss, 2014; Gotby, Lichtenstein, Langstrom & Pettersson, 2018; National Autistic Society, 2014; Roberts, Koenen, Lyall, Robinson, & Weisskopf, 2015, White & Buehler, 2012). Becoming an autistic victim of crime is often resultant from the core characteristics associated with ASD. For example, difficulties understanding social interactions and difficulties with understanding the thoughts and intentions of others have been associated with an increased risk of hate crime (Chaplin & Mukhopadhyay, 2018), exploitation (Chandler, Russell, & Maras, in press; Fisher,

Moskowitz, & Hodapp, 2013; North, Russell, & Gudjonsson, 2008) and sexual abuse (Brown-Lavoie et al., 2014; Lindblad & Lainpelto, 2011). The National Autistic Society Careless Report (2014) identified that a large proportion (49%) of the 1,344 autistic included within the study individuals had been the victims of physical, sexual or financial abuse, or had been forced/manipulated to do something that they did not want to do by someone that they thought of as a friend (National Autistic Society, 2014). These findings highlight the need for further research into this area to help identify strategies for helping prevent autistic people becoming victims of crime, especially as seen from above from individuals whom they know and seemingly trust.

Bullying is frequently reported in ASD (Reid & Batton, 2006; Cappadocia, Weis, & Pepler, 2012; Chen & Schwarz, 2012; Hebron & Humphrey, 2014; Bitsika & Sharpley, 2014) with social vulnerability (i.e., difficulty detecting or avoiding potentially harmful interpersonal interactions; Pinsker, Stone, Pachana, & Greenspan, 2006) predicting whether an individual was a victim of bullying (Sofronoff, Dark & Stone, 2011). Autistic samples have been reported to demonstrate increased social vulnerability compared to TD individuals (Sofronoff et al., 2011). Sofronoff et al. (2011) suggested that autistic children lack the social intelligence necessary to understand interpersonal occurrences, such as role taking, empathic judgement, person perception, moral judgement, referential communication and interpersonal tactics (Sofronoff et al., 2011), which is suggested to be underpinned by diminished ToM abilities (Sofronoff et al., 2011). In summary, from the literature it may be tentatively suggested that autistic individuals may be more likely to be victimised. It is important to note that victims are essentially witnesses from the purpose of an investigation.

Research suggests that once in contact with the CJS, autistic victims and witnesses are largely dissatisfied with their experiences of the CJS - at both police (Crane, Maras, Hawken, Mulcahy, & Memon, 2016) and court stages (Maras et al., 2017), which is at odds with police

and legal professionals, who generally feel their interactions with autistic individiuals have gone more positively (Crane et al., 2016; Maras et al., 2017). Interviews appear to be particuarly problematic (Maras, Mulcahy, Crane, Hawken, & Memon, 2018). Autistic individuals have the potential to provide good evidence, however this is dependent on the interview technique employed by the police officer. Research has found that the technique used for interview influences the accuracy of the accounts provided by autistic individuals (Maras & Bowler, 2010). For example, the Cognitive Interview, which is one of the most commonly used evidence-based interview techniques may impair the quality of autistic witnesses' accounts, whereas a structured interview without the Cognitive Interview mnemonics produces similar recall in (intellectually able) autistic and TD witnesses (Maras & Bowler, 2010, 2012; Maras, Mulcahy, Memon, Picariello, & Bowler, 2014). It may be that the nature of the task instructions within the Cognitive Interview burden working memory and executive functions, which may be particularly problematic for ASD recall (e.g., Maister, Simons, & Plaisted Grant, 2013). Specifically, the 'gold-standard' open-ended interview prompts seem to be difficult for autistic witnesses, who may need more focussed retrieval cues with set parameters from the outset (see Maras et al., 2018; Maras, Memon, Lambrechts & Bowler, 2013). Overall, it is important to remember that autistic individuals are able to provide accurate accounts but that this requires the use of appropriate interview techniques that allow for the individual's memory and cognitive profiles.

1.4.2. Autistic offenders

Earlier studies of autistic offending typically concentrated on individual or series of case studies which suggest a link between ASD-specific factors including restricted interests, failure to appreciate effect of behaviour on others, poor social skills and difficulties establishing appropriate peer relationships (Baron-Cohen, 1988; Barry-Walsh & Mullen,

2004; Chen et al., 2003; Chesterman & Rutter, 1993; Everall & Lecouteur, 1990; Griffin-Shelley, 2010; Haskins & Silva, 2006; Kohn et al., 1998; Mawson, Grounds & Tantum, 1985; Milton, Duggan, Latham, Egan, & Tantum, 2002; Murrie, Warren, Kristiansson, Dietz, 2002; Palermo, 2004; Ray et al., 2004; Schwartz-Watts, 2005). Although these studies offer some insight, the case study methodology mean suggestions are very speculative, thus findings from the more rigorous ones will be discussed in more depth (e.g., those using unbiassed sampling methods, larger sample sizes, inclusion of comparison groups).

Latterly more robust studies with more rigorous sampling methods, larger sample sizes and the inclusion of comparison groups (e.g., autistic non-offenders; typically developed offenders) have been conducted which have greatly improved the understanding of offending in autistic populations. These studies have used systematic sampling of specific populations such as the courts (e.g., Kumagami & Matsuura, 2009) or *all* those referred for forensic psychiatric evaluation over a specified time period (e.g., Helverschou et al., 2015). This introduction will primarily include only studies that have employed rigorous sampling techniques as described above unless this methodology has not been employed within an area (e.g., autistic experience of prison) but is required to fully describe the autistic offender population.

1.4.2.1. Prevalence of ASD in forensic populations

Research indicates a prevalence rate of ASD in adults in prison of up to 4.4% (Fazio, Pietz, & Denney, 2012; Robinson et al., 2012). However, these estimates should be interpreted with caution for a number of reasons. The main reason being the use of screening tools (Fazio et al., 2012; Robinson et al., 2012) that may provide an inaccurate representation of autistic traits for a variety of reasons including the lower literacy levels in prisons (Creese,

2015; Prison Reform Trust, 2017) and the possible difficulties associated with self-report in autistic individuals (Adams, Fredstrom, Dunca, Holleb & Bishop, 2014; Findon et al., 2016; Hesselmark, Plenty, & Bejerot, 2013; Mazefsky, Kao, & Oswald, 2011; Shalom et al., 2006). In addition, Robinson et al. (2012) tested a new tool for ASD screening which demonstrated poor sensitivity to the Autism Quotient 50 (a brief self-report tool for assessing autistic traits, Baron-Cohen et al., 2001) and had difficulties with inter-rater reliability (Robinson et al., 2012). To date, only one UK prison (HMP YOI Feltham) has released information on the numbers of *diagnosed* autistic offenders, which indicates an ASD prevalence rate of 4.5% (National Autistic Society, 2017). This information is not published in the academic literature and similarly to Fazio et al. (2012), the data is only from one establishment which may mean the results may not be generalisable. However, to date this is the best available information and tentatively suggests that ASD may be over-represented in prison settings when compared to 1% ASD prevalence observed in the general population (Baird et al., 2006; Brugha et al., 2011).

In addition to prison populations, research has also investigated the prevalence of ASD diagnoses in a court setting indicating prevalence rates of 3.2% to 18.2% (Kumagami & Matsuura, 2009) and within forensic hospitals where prevalence rates are reported to be between 1.5% and 18% (Hare, Gould, Mills, & Wing, 1999; Scragg & Shah, 1994; Soderstrom, Sjodin, Carlstedt, & Forsman, 2004; Soderstrom, Nilsson, Sjodin, Carlstedt, & Forsman, 2005). In samples referred for forensic psychiatric evaluation, ASD prevalence reportedly ranged from 3% (Siponmaa, Kristiansson, Jonson, Nydén, and Gillberg, 2001) to 8.4% (Enyati Grann, Lubbe, & Fazel, 2008). Thus, psychiatric facilities prevalence rates demonstrated much variation however all were still higher than the 1% observed in the general population (Baird et al., 2006; Brugha et al., 2011). A major strength of the forensic psychiatric service data is that the offenders have a clinical diagnosis of ASD, which is a

feature lacking in most of the available prison studies (which typically use screening tools), and the differing prevalence rates may be resultant from the types of crime included within the research. For example, Enyati et al. (2008) looked solely at arsonists (male and female) and found a higher ASD prevalence in male arsonists (but not female). Another possible explanation for some of the higher rates observed in psychiatric facilities could be that autistic individuals are reported to have high rates of psychiatric comorbidities (Joshi et al., 2013; Siminoff et al., 2008) thus may be more likely to be in psychiatric facilities than prison. A final consideration for the reported elevated prevalence rates of ASD in forensic psychiatric facilities is that mental health impairments may be the primary reason for offending and not the ASD diagnoses itself (Newman & Ghaziuddin, 2008).

It is important to acknowledge that although the above research suggests that there is an increased prevalence of ASD within the CJS, autistic offenders nevertheless commit the same number or fewer offences than TD offenders. This suggests that autistic people may be less likely to offend than individuals of the same age and gender (King & Murphy, 2014). In summary of the available prevalence data, research suggests that there is an increased prevalence of ASD within all offender provisions (e.g., prisons, forensic hospitals) however there are a number of methodological flaws (e.g., use of screening tools, ungeneralizable samples) which need to be addressed before firm conclusions can be made.

1.4.2.2. Types of crimes committed by autistic offenders

Whilst several published studies have attempted to detail the types of crimes committed by autistic individuals only four have included comparison groups of offenders without ASD (Cheely et al., 2012; Kumagami & Matsuura, 2009; Mouridsen, Rich, Isager, & Nedergaard, 2008; Woodbury-Smith, Clare, Holland, & Kearns, 2006) and only two (Cheely et al., 2012; Kumagami & Matsuura, 2009) have used an unbiased sample (i.e., total samples

or random samples; King & Murphy, 2014). Results indicate that autistic offenders commit significantly more crimes against the person (e.g., assault, robbery and sexual offences) (Cheely et al., 2012; Kumagami & Matsuura, 2009; Mouridsen et al., 2008; Woodbury-Smith et al., 2006) compared to TD offenders. Typically, between 14% and 39% of autistic offences were against the person compared to 6-20% of TD offences (Cheely et al., 2012; Kumgami & Matsuura, 2009).These reportedly higher rates of crimes against the person may be explained by difficulties in social cognition including social skills deficits (Chesterman & Rutter, 1993; Griffin-Shelley, 2010; Haskins & Silva, 2006; Kohn et al., 1998; Murrie et al., 2002; Ray et al., 2004; Realmuto & Roble, 1999), interpersonal naiveté (Griffin-Shelley, 2010; Helverschou et al., 2015; Murrie et al, 2002; Ray et al., 2004), emotion recognition (Griffin-Shelley, 2010; Katz & Zemishlany, 2006; Murrie et al., 2002; Ray et al., 2004; Woodbury-Smith et al., 2005) and recognising the harm being caused to the victim (Griffin-Shelley, 2010; Katz & Zemishlany, 2006; Murrie et al., 2002). Woodbury-Smith et al. (2005) reported that autistic offender ToM as measured using the Reading the Mind in the Eyes Test (Baron-Cohen et al., 1997, 2001) is not significantly diminished compared to TD non-offenders, however case study evidence suggests that autistic sexual offenders have difficulty applying ToM to real life situations (Chesterman & Rutter, 1993; Kohn et al., 1998).

Alternatively, some studies have reported that property offences (e.g., burglary, arson and trespassing) are typically less frequently committed by autistic offenders than TD offenders (Cheely et al., 2012; Kumagami & Matsuura, 2009). Rates of property crime for autistic offenders ranged from 14-20%, which is substantially lower than the 29-57% reported for TD offenders (Cheely et al., 2012; Kumgami & Matsuura, 2009). However, there are inconsistencies in the literature. For example, Mourisden et al. (2008) reported increased incidents of arson and Woodbury-Smith et al. (2006) reported increased criminal damage in autistic offenders. In addition to not including unbiased samples (i.e., not total population

samples or random samples of the area of the CJS being studied) in these last two studies, these differences may also be explained by the offence classification methods used whereby Cheely et al. (2012) and Kumagami and Matsuura (2009) grouped offences (i.e., crimes against the person, property crimes), whereas Mouridsen et al. (2008) and Woodbury-Smith et al. (2006) provided information on individual offences enabling specific offence comparisons to be made.

Autistic offenders have also been reported to be significantly less likely to engage in driving offences (Mouridsen et al., 2008) and no significant differences have been identified on public order offences (Cheeley et al. 2012). Further inconsistent findings have appeared for drugs offences, with Cheely et al. (2012) reporting no significant differences but Woodbury-Smith et al. (2006) reporting significantly fewer drugs offences in autistic offenders. However, this may again be resultant from sampling differences, with Cheely et al. (2012) reviewing the notes of all who met their inclusion criteria for offences committed whereas Woodbury-Smith et al. (2006) were reliant on participants actively engaging with the research and reported that 56% of those invited to participate did not respond or were unwilling to participate.

Whilst not empirically tested, a link has also been suggested between autism or autistic traits and cyber dependent deviancy (i.e., behaviours or offences that require a computer, computer network or other information communication technology; Leddingham & Mills, 2015; McGuire & Dowling, 2013; The National Crime Agency, 2016; National Crime Agency, 2017; Seigfried-Spellar, O'Quinn & Treadway, 2015). There is very limited information on the psychological characteristics and motivations of cyber-dependent deviants, despite cyber-dependent offences accounting for 1.6 million offences in the year ending June 2017 (Office for National Statistics, 2017). When compared to more traditional crime, cyber-dependent crime rates are much higher than violent crimes (1.24 million),

burglary (667,000) and robbery (132,000). Given the high prevalence, cost to the economy and the perceived association with ASD, there is a need for future research to investigate this purported ASD link and the motivations of the individuals engaging in these offences.

1.4.2.3. Autistic experience of the Criminal Justice System

Estimates from community samples indicate a prevalence of police contact in ASD of between 9-21% (Rava, Shattuck, Rast, & Roux, 2017; Tint, Palucka, Bradley, Weiss & Lunsky (2017) and autistic suspects accounted for 1.3-6.7% of court populations (Kumagami & Marsuura, 2009). Whilst the majority of Canadian parents of autistic adolescents and adults who had been in contact with the police were satisfied or very satisfied with the police (Tint et al., 2017), the opposite was found in the UK (Crane, Maras, Hawken, Mulcahy, & Memon, 2016) which could be reflective of differences in the systems and their approaches. Crane et al. (2016) found largely negative responses following contact with the police highlighting factors such as a lack of ASD awareness and knowledge, lack of information and explanation provided by police, delays at various stages and some reported feeling victimised or discriminated against by the police. Methodological differences may explain this discrepancy with Tint et al. (2017) using solely parent report whereas Crane et al. (2016) used a combination of self and parent report. To date, there is limited research about how autistic individuals experience the CJS as an offender with research limited to four papers (Allen et al., 2008; Helverschou et al., 2018; Newman et al., 2015; Patterson, 2008). However, a dominant theme throughout the CJS pathway (i.e., from arrest to prison) was a greater need for both knowledge of ASD and the support needs that an autistic offender may have (Allen et al., 2008).

At the arrest stage, all participants in Allen et al. (2008) recalled the arrest process as a negative emotional experience. The response of one offender during arrest was a clear

demonstration of the undue compliance reported in ASD (e.g., immediate confessions). All autistic offenders reported physical (e.g., shaking) and psychological symptoms (e.g., stress, traumatic) in response to arrest. Individuals spoke about the uncertainty about what would happen next and discomfort with other people at the police station (Allen et al., 2008). An interesting comparison to the UK study by Allen et al. (2008) was conducted by Helverschou et al. (2018) with autistic offenders in Norway. Of the nine autistic offenders interviewed, six understood why police were called, six treated well when arrested and six felt police had listened to their explanations. Of the remaining three offenders, two reported that they didn't initially understand why the police were called and were not given this reason or given the opportunity to explain what had happened in relation to the offending behaviours. These individuals reported panicking upon the arrival of the police, consequently fighting with the police leading to isolation after the arrest. This research highlights the importance of not only clear communication between law enforcement and autistic offenders to help reduce anxiety and associated negative behaviours (e.g., anxiety, aggression) but also the importance of gaining a better understanding of an individual's own understanding of their behaviours. Only one participant felt that his ASD diagnosis was not taken into consideration. A cross cultural comparison of police training and policies would help to understand the differences observed.

Following arrest, autistic offenders are reported to often make a full confession during the interrogation interview (54-67% (n = 6-26; Helverschou et al., 2015, 2018) with only 17% not confessing (the remaining 29% made a partial confession) (Helverschou et al., 2015) comparable to the 55% TD confession rate (Gudjonsson, 2003). Autistic individuals have been reported to demonstrate heightened compliance (Chandler et al., in press; North et al., 2008), which may have driven these higher rates of confession reported. Again, differences may be observed between offences with research suggesting that autistic sexual offenders are

more likely than autistic violent offenders to deny the crime (Søndenaa et al., 2014). This may help to explain the increased confessions reported in Helverschou et al. (2015) as 44% of the sample had committed violent crimes compared to only 25% who had committed sexual offences.

Mixed perceptions of interviews were reported by Allen et al. (2008) with negative experiences of autistic offenders including the number of interviews, length of interviews, difficulties concentrating, too many questions and feeling pressured and uncomfortable. The involvement of an appropriate adult was really advocated for with four offenders reporting that they really benefitted from the support provided by the appropriate adult (Allen et al., 2008).

The court experience was found to be very stressful, anxiety provoking, distressing and challenging (Allen et al., 2008; Helverschou et al., 2018) often due to not feeling that their ASD diagnosis was taken into account, not understanding what was going to happen next, lack of support, being put on the spot, standing in front of judge, not being believed and the verdict (Allen et al., 2008). Some offenders reported that they understood what was happening (Helverschou et al., 2018) whereas others reported not knowing what was going on and/or not being able to take everything in (Allen et al., 2008). Autistic offenders really valued the support that they received from their barrister, family and appropriate adults (Allen et al., 2008) which could be consistently incorporated into methods to help the autistic offender to navigate the CJS better. Furthermore, some autistic offenders felt that verbally presenting themselves was not appropriate for them and that they would have communicated better using a written format (Helverschou et al., 2018).

Compared to other areas of the CJS (i.e., arrest, interview, court) the autistic experience of prison was more variable (Allen et al., 2008; Helverschou et al., 2018). For example, all participants in Helverschou et al. (2018) reported that they felt that they had

coped well with prison and one participant stated that they could not think of any negative points about prison. Positive responses to prison included the appreciation of greater structure (Allen et al., 2008; Helverschou et al., 2018) and less free time (Allen et al., 2008). The negative experiences of prison can be split into four categories: (1) social; (2) family; (3) environmental; (4) rules and routines. *Social* factors included being locked in a cell with people they didn't know (Allen et al., 2008), difficulties interacting socially and making friends (Allen et al., 2008; Patterson, 2008), feeling different to other prisoners (Newman et al., 2015) or uncomfortable around non-autistic offenders (Helverschou et al., 2018). These difficulties often led to vulnerability to abuse or bullying (Newman et al., 2015; Patterson, 2008). *Family* issues included having limited contact with family (Helverschou et al., 2018) and missing family (Allen et al., 2008) whereas *environmental* factors included the loss of freedom (Helverschou et al, 2018), boredom (Allen et al., 2008) and the unpredictability of the environment (e.g., frequent changes in cells, cell mates and officers, Allen et al., 2008; Newman et al., 2015). Finally, *rules and routines* were troublesome for some autistic offenders with the requirement to stick to rules and routines (Allen et al., 2008), varying adherence to them (Patterson, 2008) and the logic and officer dependent nature that underpinned the rules and routines (Newman et al., 2015) frequently reported difficulties. Self-imposed routines were a reported coping mechanism for the unpredictable prison environment however anxiety was further increased when unable to carry out self-imposed routines due to the unpredictability of the prison environment (Newman et al., 2015). Typically, when positive experiences of prison were reported they were resultant from improved staff understanding and special measures being implemented (e.g., moved to a smaller wing following difficulties on a larger one, Allen et al., 2008).

1.4.2.4. Autistic offender and offence-related characteristics

The literature indicates that the mean age of receiving an ASD diagnosis in autistic adult offender populations is 25.3 years to 31.1 years (Murphy, 2007; Helverschou et al. 2015), which is much older than non-offender autistic individuals. For example, in a review of 42 studies the mean age at ASD diagnosis was reported to be between 3.17 to 10.0 years (Daniels & Mandell, 2014). Kawakami et al. (2012) reported that juvenile autistic offenders received diagnoses far later, with research reporting that the age at which an ASD diagnosis was received significantly predicted offending status (i.e., offending, non-offender) however no such comparison is available for adult autistic offenders. Kumagami and Matsuura (2009) found that 75% of autistic offenders were only diagnosed following contact with the CJS suggesting that often individuals are overlooked due to their relatively high intellectual abilities (Kumagami & Matsuura, 2009). This is particularly concerning given the reported difficulties experienced by autistic offenders at all stages of the CJS from arrest through to prison (autistic experiences of the CJS are discussed later in this introduction).

Restricted or repetitive interests are core ASD diagnostic criteria (APA, 2013; World Health Organisation, 2018) and can involve a wide range of usually harmless interests (e.g., animals, computer games), however research suggests sometimes interests can be linked to offending behaviours (Barry-Walsh & Mullen, 2004; Chen et al., 2003; Hare et al., 1999; Haskins & Silva, 2006; Helverschou et al., 2015; Woodbury-Smith et al., 2010) For example, Woodbury-Smith et al. (2010) reported that autistic violent offenders were significantly more likely to have a violent special interest than autistic non-offenders.

Autistic offender research indicates that the average age at first offence is 25.8 years old (Allen et al., 2008) whereas TD offenders typically start offending around 23.5 years of age (Farrington, 2006). Some links between autistic offender characteristics and offences committed have been reported, although limited information is available. For example, risk of

violent offending has been reported to increase with age (Långström, Grann, Ruchkin, Sjöstedt, & Fazel, 2009) and autistic sex offenders are typically older than violent offenders (Søndenaa et al., 2014). Male gender has been identified as a risk factor for violent offending in ASD (Långström et al., 2009) and autistic violent offenders are reported to have greater earlier contact with social welfare (Søndenaa et al., 2014).

More than half of autistic offenders have no previous convictions (56%, Helverschou et al., 2015) indicating that first offences are typically serious and that they may not engage in more minor offences first. For example, of the sample of 48 reported by Helverschou et al. (2015), only 21% had one or two convictions, 17% three to five and only six percent had more than five convictions. Although taken from a small sample (n = 9), recent research indicates that autistic offenders tend to offend alone (89%) rather than with other people (11%) (Helverschou, Steindal, Nøtestad, & Howlin, 2018). However, research indicates that autistic individuals may be more compliant with the request of others (Chandler et al., in press; North et al., 2008), with some studies specifically suggesting susceptibility to exploitation from criminals (Allen et al., 2008; Murrie et al., 2002; Katz & Zamishlany, 2006), suggesting that autistic individuals may be more likely to commit offences under instruction from others than alone. However, at present there is a paucity of research on ASD offending to confirm this supposition. This area of research is important to understand in greater detail, with a larger sample and by understanding the factors which influence choice of offending style (alone or with others) to provide greater understanding of the profile of autistic offenders and risk factors for offending.

Helverschou et al. (2015, 2018) found that a large percentage of autistic offenders (up to 88%) stated that they had planned the offence which suggests that there is a period of time in which an intervention could be staged if reliable risk factors for autistic offending are identified. However, it has also been suggested that often crimes happen ‘accidentally’

(Helverschou et al., 2018) and that impulsiveness may be involved in autistic offending (Allen et al., 2008) which may limit this time period. Future research should investigate the timeline preceding the offending behaviours, reasons for offending, and the profile of the offences committed (i.e., not just the type of offence).

Post offending, Helverschou et al. (2018) reported that, although 89% agreed that they had committed a crime and 78% agreed that it was both serious and illegal, a number of the offenders did not appear to fully understand that they had done anything wrong (e.g., reporting that they just wanted to make friends but were provoked which lead to offence). Research reports a number of social difficulties and misunderstandings which may influence offending in autistic samples including social naivety, a lack of awareness and/or concern for outcome and misinterpretation of the rules (Allen et al., 2008).

1.5. Reasons for offending

1.5.1. Autistic reasons for offending

Typically, the reasons for engaging in offending are garnered from professional reports (e.g., forensic psychiatric reports) with much of the data coming from case studies or series of case studies which have limited generalisability. Previously identified reasons for offending include: special interests and associated preoccupations (Barry-Walsh & Mullen, 2004; Chesteman & Rutter, 1993; Murrie et al., 2002; Ray et al., 2004), concrete thinking (Barry-Walsh & Mullen, 2004), diminished Theory of Mind with associated social skills difficulties (Barry-Walsh & Mullen, 2004; Griffin-Shelley, 2010; Kohn et al., 1998; Murrie et al., 2002; Ray et al., 2004; Realmuto, & Roble, 1999) and the inability to consider the consequences of actions (Barry Walsh & Mullen, 2004; Griffin-Shelley, 2010; Katz & Zemishlany, 2006; Murrie et al., 2002).

The most rigorous study to date included all offenders identified as having an ASD diagnosis that were referred for forensic psychiatric evaluations in Norway between 2000 and 2010 (Helverschou et al., 2015). The reported reasons for offending included idiosyncratic rationalisations/explanations (75%), obsessions/special interests (67%), social naivety (58%), revenge (33%) and social misunderstandings (31%) (Helverschou et al., 2015). A potential problem with relying on this data is that when professional and autistic reported reasons are compared, there are a number of discrepancies (Helverschou et al., 2018). For example, professionals reported that rigidity was a factor underlying offending in 100% of offenders, however this factor was not reported by any of the autistic offenders (Helverschou et al., 2018). Thought rigidity is included within the diagnostic criteria for ASD (APA, 2013) thus understanding the reasons why the autistic individuals themselves believes that they offended would be important for designing effective interventions. Whilst few research studies ask autistic offenders why they engaged in offending, of those that did majority alluded to the fact that aspects of their ASD increased their vulnerability to the offences that they committed, although none directly acknowledged this association (Allen et al., 2008).

The reasons provided by autistic offenders for engaging in offending behaviours reported in previous research can be divided into four main categories: (1) obsessions and special interests; (2) social cognition factors; (3) disequilibrium factors; and (4) emotional factors. Obsessions and special interests include special interests (Allen et al., 2008; Helverschou et al., 2018) and being obsessional in the pursuit of a desired outcome (e.g., to be proved right) (Allen et al., 2008). Social cognition factors may result in heightened vulnerability to exploitation by others (Allen et al., 2008; Helverschou et al., 2018), a lack of consideration or awareness of the implications of actions taken (Allen et al., 2008), naivety regarding social rules (Allen et al., 2008), tendency to misread the emotions/behavioural of others (Allen et al., 2008), an inability to stop and think prior to acting, and poor social skills

(Allen et al., 2008). Disequilibrium factors include social rejection, bullying, sexual rejection, family conflict, change of domicile, change of professional support bereavement, job losses, mental health difficulties, and substance use (Allen et al., 2008). Emotional factors include poor emotional expression (Allen et al., 2008), excitement (Helverschou et al., 2018), revenge (Helverschou et al., 2018), and stress (Allen et al., 2008; Helverschou et al., 2018). Stress was cited as a reason for offending with contributor to stress including, family conflict, relationship difficulties, health problems, difficulties coping with work, being out of work and the death of a close relative. Stress was reported to lead to a deterioration in mental health another reason cited for offending (Allen et al., 2008). The influence of these stressors appeared to be exacerbated by maladaptive coping strategies such as choosing not to seek help, increased alcohol and illicit drugs consumption, and having poor outlets for emotions (Allen et al., 2008).

These two studies (Allen et al., 2008; Helveschou et al., 2018) are the only ones to ask autistic offenders why they engaged in illegal behaviours as typically this information was gained from professional or clinical reports. Whilst these studies offer some important insight into their reasoning, there remains a need for research to look at the reasons for engaging in specific offences as it would be hypothesised that the reasons for engaging in crimes against the person (e.g., sexual offences, assault) would be very different to reasons for engaging in property (e.g., burglary, fraud) or online crimes (e.g., hacking, phishing).

1.5.2. Intelligence, education and employment

In TD offenders, lower intelligence is reported to increase the likelihood of offending with beta values between 0.19 and 0.29 (Frisell, Pawitan, & Långström, 2012; Verbruggen, Blokland, & van der Geest, 2012). However research suggests that autistic offenders typically demonstrate at least average intelligence (Kumagami & Matsuura, 2009; Kawakami et al.,

2012; Mouridsen et al., 2008; Murphy, 2003; Murphy, 2007; Woodbury-Smith et al., 2005; 2010) with no relationship identified between IQ and criminal conviction (Mouridsen et al., 2008). The IQs of autistic offenders were reported to range between 91.2 (Woodbury-Smith et al, 2005; 2010) and 102.0 (Murphy, 2007) which is higher than reported in TD offenders in the UK (M = 87.1; SD = 12.5) (Hayes, Shackell, Mottram & Lancaster, 2007). No UK data comparing ASD and TD offenders is currently available, but Kumagami & Matsuura (2009) found no significant differences between TD and pervasive development disorder (PDD) offenders within a Japanese sample. Together this research highlights the importance of considering and potentially controlling for IQ in autistic offender research.

Despite research indicating that autistic offenders typically have at least average IQ, poor education attainment is reported with around two thirds of offenders having no education or basic school leaving qualifications (Helverschou et al., 2015). Employment is also reported to be low with only approximately 27% of autistic offenders reporting regular employment (Helverschou et al., 2015). There are two views on this: (1) employment in autistic populations is generally low with only around 46% of autistic individuals being employed (Howlin, 2012) which is much lower than the 76% reported for the general population (Office for National Statistics, 2018); (2) unemployment rates and employment instability may increase the likelihood of engaging in offending behaviours (Aaltonen, Kivivuori, & Martikainen, 2011; Fergusson, McCleod, & Horwood, 2014; Kleck & Jackson, 2016; Verbruggen et al., 2012). In TD populations, being employed reduces the number of convictions adult males received by nearly 49% (Verbruggen et al., 2012). It has also been found that the reasons for unemployment influence offending; for example, Kleck and Jackson (2016) reported that it was not solely being unemployed that predicted likelihood of engaging in property offending but rather if the reasons for being unemployed were not viewed as legitimate (e.g., socially acceptable). Additionally, Aaltonen et al. (2011) report

that the length of unemployment is an important factor in the relationship to offending. The high levels of unemployment reported in the general ASD population (Howlin, 2012) highlights the importance of measuring a range of variables to identify whether they are significant in ASD offending. A further variable to consider is moral reasoning and this will now be discussed.

1.5.3. Moral reasoning

Moral reasoning refers to how people reason or judge whether an action is right or fair (Kohlberg & Hersh, 1977) and also the ability to distinguish between socially acceptable and socially unacceptable thoughts and behaviours (Gibbs, Basinger, Fuller, & Fulkler, 1992). The TD offender literature indicates poorer and less advanced moral reasoning in TD offenders compared to TD non-offenders (e.g., Chen & Howitt, 2007; Palmer, 2003; Palmer & Begun, 2006; Spenser et al., 2015; Stams et al., 2006). The moral reasoning abilities of autistic offenders has not been researched to date, however, autistic non-offenders typically indicate moral reasoning impairments (Buon et al., 2013; Senland & Higgin-D'Alessandro, 2013; Takeda, Kasai, & Kato, 2007; Zalla, Barlassina, Buon, & Leboyer, 2011). Shulman, Guberman, Shiling, and Bauminger, (2012) reported that although they found no significant difference between the autistic and TD participants when evaluating the violations of social norms, the answers presented were strongly governed by learnt rules. This may suggest that if learnt rules cannot be applied, difficulties evaluating moral scenarios may occur. The available literature indicates that both TD offenders and autistic non-offenders demonstrated moral reasoning impairments which suggests that moral reasoning cannot be the sole reason for engaging in offending behaviours and that additional factors must be interacting. One of these possible interacting factors is psychiatric comorbidity which will be discussed below.

1.5.4. Psychiatric comorbidity

Psychiatric comorbidity is common in TD offenders with a substantial body of literature demonstrating an increased prevalence of mental health difficulties (e.g., Fazel & Seewald, 2012; James & Glaze, 2006; Way, Sawyer, Lilly, Moffitt, & Stapholz, 2008; Roberts, Yang, Zhang, & Coid, 2008; Steadman, Osher, Robbins, Case, & Samuels, 2009). Indeed, within the UK, recent reports indicated that only 10% of offenders did *not* meet the diagnostic criteria for at least one mental disorder (Bebbington et al., 2017).

The autistic offender literature indicates variable prevalence rates of comorbid psychiatric diagnoses, ranging from 13-83% of autistic offenders (Helverschou et al., 2015; Långström et al., 2009) which is relatively comparable to the non-offending autistic estimate of up to 84% reported in autistic non-offending samples (Howlin & Moss, 2012). Within a violent offender sample, although findings initially identified an increased prevalence of ASD diagnoses, ADHD, conduct disorder, psychiatric disorders and substance misuse were the most important predictors of offending, and in fact ASD served as a protective factor once co-occurring diagnoses were taken into account (Heeramun et al., 2017). Others have also found that co-occurring psychiatric conditions may play a role in many cases of violent offending in ASD (Allen et al., 2008; Haw, Radley, & Brookes, 2013; Långström et al., 2009; Newman & Ghaziuddin, 2008).

Regarding the specific diagnoses that have been reported in autistic offenders, psychotic disorders were prevalent in 13-27% (Allen et al., 2008; Helverschou et al., 2015; Långström et al., 2009; Søndenaa et al., 2014), affective disorders in up to 24% (Allen et al., 2008; Helverschou et al., 2015; Långström et al., 2009; Søndenaa et al., 2014), personality disorders in 2-21% (Allen et al., 2008; Helverschou et al., 2015; Långström et al., 2009; Søndenaa et al., 2014), OCD in 4% (Helverschou et al., 2015), adjustment disturbances in 4% (Helverschou et al., 2015), Tourette syndrome in 4% (Helverschou et al., 2015), phobia in 2%

(Helverschou et al., 2015) and somatoform disorders in 2% (Helverschou et al., 2015). Finally, when compared to TD offenders, Kumagami and Matsuura (2009) reported no significant difference between pervasive developmental disorder (PDD) offenders and TD offenders in terms of comorbidity of mental disorders, suggesting a similar relationship between psychiatric comorbidity and offending in both groups; however, to date, limited autistic offender data is available.

1.5.5. Substance Use

Substance use is frequently associated with TD offending, with a substantial body of literature identifying a significant relationship between substance use and offending across most offence types (see Fazel, Bains & Doll, 2006; Murray, de Castro Cerquiera, & Kahn, 2013; Roberts et al., 2008; Tharp et al., 2012) although literature examining the relationship between drug use and sexual offending is more mixed (Tharp et al., 2012; Whitaker et al., 2008). Research suggests that the prevalence of alcohol and drug dependence in UK TD offenders is between 20-32% and 39-55% respectively (Bebbington et al., 2017; Roberts et al., 2008); vastly higher than the 1% substance dependence observed in the TD non-offending population (McManus, Bebbington, Jenkins, & Brugha, 2016)

Previously, autistic individuals were thought to engage in less substance use due to the social and communication difficulties associated with the disorder (Santosh & Mijovic, 2006) or that autistic individuals were less likely to engage in behaviours that lead to substance use in TD populations (i.e., risk taking, novelty seeking behaviour, experiencing peer pressure, Sizoo, van der Brink, Gorissen van Eenige, & Jan van der Gaag, 2009). However, more recently the heterogeneity in ASD presentation has been acknowledged and it has been suggested that autistic individuals may be at increased risk of substance disorder (Butwicka et al., 2017; Sizoo et al., 2009) with the suggestion that they may use substances to

self-medicate to cope with co-morbid symptoms (e.g., anxiety) of ASD (Clarke, Tickle, & Gilliott, 2016; Rengit, McKowen, O'Brien, Howe, & McDougle, 2016; Sizoo et al., 2009).

Helverschou et al. (2015) reported that 21% of autistic offenders were intoxicated whilst they engaged in their offending behaviour (Helverschou et al., 2015) and substance use more generally has been reported in up to 38% of autistic offenders (Allen et al., 2008; Helverschou et al., 2015; Långström et al., 2009; Søndenaa et al., 2014). The most frequently used substances by autistic offenders were alcohol (38%), cannabis (20%), central stimulants (12%), opiates (8%), and hallucinogens (8%) (Helverschou et al., 2015). Autistic offender research indicates differences between offence type, with substance abuse disorder prevalent in 10-16% of autistic violent offenders, 1% of non-violent offenders and 0% of sexual offenders (Långström et al., 2009; Søndenaa et al., 2014) a finding mirrored by some TD offender literature (Craig, Browne, Beech, & Stringer, 2006) but not by others (Newman, Wanklyn, Ward, Cormier, & Day, 2012).

1.5.6. Childhood Adversity

Familial discord (e.g. being placed in foster care, familial violence, home stability, parental divorce or separation) has frequently been reported to be related to offending in the TD literature (Derzon, 2010; Murray et al., 2013). The autistic offender literature appears to mirror this with autistic offenders significantly more likely than autistic non-offenders to have experienced greater family violence, parental death, parental divorce or other parental loss (e.g., foster care) than the non-offender autistic group (Kawakami et al., 2012). Helverschou et al. (2015) found that almost one third of autistic offenders had been placed in foster or institutional care with three percent experiencing more than three changes of non-familial carer during childhood. Despite this, close family contact was reported in 77% of autistic offenders (Helverschou et al., 2015). Thus, the reasons for this childhood separation

needs further clarification (e.g., was separation due to unforeseeable circumstances such as parental hospitalisation, offender's behaviour unmanageable by parent).

Abuse during childhood has been widely associated with TD offending (e.g., Connolly & Woolons, 2008; Cuadra, Jaffe, Thomas, & DiLillo, 2014; Hosser, Raddatz, & Windzio, 2007; Jespersen, Lalumière, & Seto, 2009; Reckdenwald, Mancini, & Beauregard, 2013; Vivolo-Kontor, DeGue, DiLillo, & Cuardra, 2013). Kawakami et al. (2012) found that compared to autistic non-offenders, autistic offenders experienced greater physical abuse, sexual abuse and neglect, and criminal behaviour was 6.3 times more likely to occur when an autistic individual had experienced neglect and 3.1 times more likely to occur when an individual had experienced physical abuse. Kumagami and Matsuura (2009) found that compared to TD offenders, autistic offenders were significantly more likely to have experienced recurrent physical abuse (e.g., push, slap, kick) and psychological abuse (e.g., called derogatory names such as lazy or ugly) by a parent or other adult within the household.

1.5.7. Social Support

Social support is negatively associated with offending risk in TD populations with the quality of social support an individual receives negatively associated with their risk of engaging in both offending and risky behaviours (e.g., sexual, substance use) (Maschi, 2006; Schroeder, Bulander, Giordano, & Cernkovich, 2010; Skeem, Eno, Manchak, Vidal, & Haddad, 2009; Spohr, Suzuki, Marchall, Taxman, & Walters, 2016; Ten Have, de Graaf, van Weeghel, & van Dorsselaer, 2014). Explanations of this effect include that social support increases the ability of an individual to engage in non-delinquent coping strategies when experiencing strain (Brezina, 2017). Social networks outside of the family unit are limited in autistic offenders with 44% reporting no friends and 56% reporting few friends or acquaintances (Helverschou et al., 2015). Non-offending autistic individuals also report

limited social networks with up to 50% of autistic individuals reporting only having one friend (Helles, Gillberg, Gillberg, & Eva, 2017; Eaves & Ho, 2008; Balfe & Tantum, 2010) and loneliness is reportedly high in ASD (Mazurek, 2014; Sundberg, 2018; Van der Aa, Pollman, Plaat, & van der Gaag, 2016). While limited social networks may be characteristic of ASD generally, it is also an important factor to consider in relation to offending due its link with criminal risk (Maschi, 2006; Schroeder et al., 2010; Skeem et al., 2009; Spohr et al., 2016; Ten Have et al., 2014). Furthermore, a lack of friends and increased loneliness in addition to other reported ASD difficulties such as increased social vulnerability (Sofronoff et al., 2011) and compliance (Chandler et al., in press; North et al., 2008) coupled with reduced social support may lead individuals to engage in unhealthy relationships which may result in exploitation and coercion into engaging in offending behaviours.

1.6. Summary and thesis aims

This review of the literature indicates that, although significant advances in the understanding of autistic offenders have been made over the last 15-20 years, our understanding of this group is still relatively poor compared to both non-offending autistic individuals and TD offenders. The literature review has identified the need for further investigation into the risk factors for offending using larger samples as well as qualitative research into the reasons why autistic offender engage in offending behaviours. Finally, there has been much speculation around the involvement of autism and autistic traits in cyber-dependent offending however research has not empirically tested this claim to date, despite the damaging effect of this claim to autistic individuals.

This thesis aims to improve understanding of: the risk factors for offending in autistic individuals; the posited link between autistic vulnerabilities (e.g., social vulnerability, compliance, ToM difficulties) and offending; the nature of offending (i.e., lone or co-

offending) in ASD; and offender-reported motivations for offending behaviours (i.e., sexual offending and cyber-dependent offending) across the autism spectrum. Risk factors for offending in ASD will be measured quantitatively using a battery of tests comprising both existing questionnaires (e.g., Gudjonsson Compliance Scale: Gudjonsson, 1997; Strange Stories test: Happé, 1994) and direct questions about risk factors identified through a thorough review of the literature (e.g., parental psychopathy; Derzon, 2010). Previous research has investigated some of the risk factors in autistic offenders (e.g., abuse; Kawakami et al., 2012; Kumagami & Matsuura, 2009), however this has been within small to moderate sized samples; to date, no research has included a wide range of variables in a single study with a large sample with comparison groups. This thesis will conduct research into risk factors using a large sample with participants matched on age and IQ. Self-reported motivations for offending will be investigated qualitatively via semi-structured interviews. This method was chosen to enable an under-researched research area to be investigated with the flexibility to follow up and ask participants to expand upon points made to further increase understanding of the motivations for offending within this group without the limitations of quantitative methods. Furthermore, thought rigidity forms part of the ASD diagnostic criteria (APA, 2013); thus, identifying the reasons why the autistic offenders themselves (as opposed to professional perception as typically presented in previous research) believe that they offended is important for informing effective interventions.

This thesis aims to answer the following research questions:

(1) Are there significant differences in profiles (i.e., mental health, substance, family and childhood, behavioural conduct and moral reasoning) between autistic offenders and: (a) autistic non-offenders; (b) TD offenders; and (c) TD non-offenders?

(2) Do autistic offenders typically offend alone or with others?

(3) Do autistic offenders demonstrate a similar profile to autistic non-offenders (i.e., diminished Theory of Mind (ToM), and social motivation coupled with heightened social vulnerability, compliance and restricted interests and repetitive behaviours)?

(4) What are the self-reported motivations for autistic sexual offending?

(5) Is there an association between autistic traits and cyber-dependent deviancy?

(6) What are the self-reported motivations for engaging in or desisting from cyber-dependent deviancy and offending?

Chapter Two

Evaluation of the risk factors for offending in ASD including mental health, substance use, family and childhood adversity, behavioural conduct and moral reasoning.

Chapter Rationale

Previous research conducted with TD samples has identified a number of factors that may have led to their offending. These have been categorised into co-occurring mental health conditions, substance use, family and childhood experiences, behavioural difficulties and moral reasoning. Whilst previous studies have investigated some of the variables included within the mental health, substance use, family and childhood experiences, behavioural difficulties and moral reasoning domains included within Chapter Two, the previous research has used small to moderately sized autistic offender samples. To date, no research has included all of the variables within a large sample of autistic offenders with comparison groups (i.e., autistic non-offenders; TD offenders; and TD non-offenders). This chapter firstly aimed to identify the profile of each of these four groups before investigating whether there were significant differences between the groups. The rationale here was to improve the understanding of the risk factors for offending in ASD, which in turn could be used to help inform interventions to help prevent initial offending or recidivism.

This declaration concerns the article entitled:									
Evaluation of the risk factors for offending in ASD including mental health, substance use, family and childhood adversity, behavioural conduct and moral reasoning.									
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Candidate's contribution to the paper (detailed, and also given as a percentage).	The candidate predominantly executed the: Formulation of ideas: Predominantly executed (90%) Design of methodology: Predominantly executed (90%) Experimental work: Predominantly executed (95%) Presentation of data in journal format: Predominantly executed (90%)								
Statement from candidate:	This paper reports on original research I conducted during the period of my higher degree by research candidature.								
Signed						Date	19/08/2018		

Abstract

Mental health difficulties, substance use, family and childhood adversity factors, behavioural conduct and diminished moral reasoning have all been linked to offending in typically developed populations. However, no large-scale studies with comparison groups has investigated these factors in relation to autistic offenders. Comparison of four independent groups (40 autistic offenders, 40 autistic non-offenders, 40 typically developed (TD) offenders, 39 TD non-offenders) indicated that behavioural conduct factors differentiated offenders (both ASD and TD) from non-offenders (both ASD and TD) and that mental health factors differentiated ASD (both offenders and non-offenders) from TD (both offenders and non-offenders) groups. No autism-specific factors were linked to offending. Supplementary research is required to further our understanding of the reasons why some autistic individuals offend.

Keywords: autism spectrum disorder; offending, crime; mental health; substance use; family and childhood adversity; behavioural conduct; moral reasoning

Evaluation of the risk factors for offending in ASD including mental health, substance use, family and childhood adversity, behavioural conduct and moral reasoning.

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder which affects approximately 1% of the general population (Baird et al., 2006; Brugha et al., 2011) but is estimated to be prevalent in up to four and a half times more people in forensic settings (Fazio, Pietz, & Denney, 2012; Robinson et al., 2012). The disorder is characterised by difficulties with reciprocal social interaction, communication and restricted, stereotyped and repetitive behaviour (World Health Organisation, 2018). Research that has utilised unbiased autistic samples (i.e., total population samples or random samples) and matched comparison groups of TD participants has reported that autistic offenders were more likely to engage in crimes against the person (e.g., sexual offences, assault, robbery) and less likely to engage in property crimes (e.g., burglary, arson and trespassing). No significant differences have been reported between autistic and TD offenders on public order or drugs offences (Cheely et al., 2012; Kumagami & Matsuura, 2009).

The general TD offender literature identifies a number of factors associated with offending including mental health difficulties (e.g., Bebbington et al., 2017, Murray, de Castro, & Kahn, 2013), substance use (e.g., Bebbington et al., 2017; Fazel, Bains, & Doll, 2006; Murray et al., 2013; Tharp et al., 2012; Whitaker et al., 2008) family and childhood adversity factors (e.g., Derzon, 2010; Murray, Farrington, & Sekol, 2012; Murray et al., 2013; Tharp et al., 2012), behavioural conduct factors (e.g., Mordre et al., 2011; Young, Tayloer, & Gudjonsson, 2016) and impaired moral reasoning (e.g., Chen & Howitt, 2007; Palmer, 2003; Palmer & Begun, 2006; Spenser, Betts, & Gupta, 2015; Stams et al., 2006).

Within autistic offender samples, limited research has implicated factors such as comorbid diagnoses (e.g., personality disorders, psychotic disorders, affective disorders), substance use and adverse childhood events in the likelihood of autistic individuals engaging in offending (Allen et al., 2008; Heeramun et al., 2017; Kawakami et al., 2012; Kumagami & Matsuura, 2009). However, such research is often limited by small sample sizes, poorly matched groups or having no comparison groups (e.g., Allen et al., 2008). To our knowledge there is no research to date which examines a *wide* range of factors in autistic offenders within a single sample with comparison groups. The present study aimed to address this gap. Below we review some of the key known risk factors in offending in TD populations (and, where available, ASD populations), before outlining predictions for the present study.

Mental Health factors

A substantial body of research shows an increased prevalence of mental health difficulties within offender populations (e.g., Fazel & Seewald, 2012; James & Glaze, 2006; Way, Sawyer, Lilly, Moffitt, & Stapholz, 2008; Roberts, Yang, Zhang, & Coid, 2008; Steadman, Osher, Robbins, Case, & Samuels, 2009). UK findings indicate that only 10% of offenders did *not* meet the diagnostic criteria for at least one mental disorder (Bebbington et al., 2017) with depression, personality disorder, anxiety and psychosis being the most commonly reported (Bebbington et al., 2017; Roberts et al, 2008). Within a mixed offence autistic sample comorbid psychiatric diagnoses were reported in 13-83% of the offenders (Helverschou et al., 2015; Långström, Grann, Ruchkin, Sjöstedt, & Fazel, 2009).The most frequently reported diagnoses were personality, psychotic and affective disorders (Allen et al., 2008; Helverschou et al., 2015; Långström et al., 2009; Søndenaa et al., 2014 which combined with the TD offender findings suggests a role of mental health in offending in both TD and autistic populations.

Substance factors

Alcohol and drugs are frequently associated with offending, with a substantial body of literature identifying a significant relationship between alcohol use and offending in typically developed (TD) populations across most offence types (see Fazel et al., 2006; Murray et al., 2013; Roberts et al., 2008; Tharp et al., 2012) however, the relationship between drug use and sexual offending is mixed (Tharp et al., 2012; Whitaker et al., 2008). Within a sample of UK offenders, research suggests that the prevalence of alcohol and drug dependence is between 20-32% and 39-55% respectively (Bebbington et al., 2017; Roberts et al., 2008); vastly higher than the 1% substance dependence observed in the general non-offending population (McManus, Bebbington, Jenkins, & Brugha, 2016) and the 2% drug dependence and 3% alcohol dependence reported in autistic non-offending populations (Joshi et al., 2013). Research with autistic offender samples reported that substance use played a role in their offending behaviour in up to 38% of cases (Allen et al., 2008; Helverschou et al., 2015; Långström et al., 2009; Søndenaa et al., 2014).

Family and childhood adversity factors

Meta and systematic analyses have identified many family and childhood factors related to offending including socio-economic status (SES, Derzon, 2010; Murray et al., 2013), childhood abuse (Connolly & Woolons, 2008; Cuadra, Jaffe, Thomas, & DiLillo, 2014; Hosser, Raddatz, & Windzio, 2007; Jespersen, Lalumière, & Seto, 2009; Reckdenwald, Mancini, & Beauregard, 2013; Vivolo-Kontor, DeGue, DiLillo, & Cuardra, 2013; Wang et al., 2012), parental violence/family conflict (Tharp et al., 2012). Being put in foster care (Derzon, 2010) and being separated from family have also been identified as factors related to offending (Derzon, 2010). Specific to parental influence, factors influencing offending include parental psychopathy (Derzon, 2010), parental divorce or separation (Derzon, 2010), parental antisocial behaviour (Derzon, 2010) and parental involvement in crime (Murray et

al., 2013). Relatedly, parental incarceration further increases the risk of antisocial behaviour (Murray, Farrington & Sekol, 2012) and offending (Murray et al., 2013).

Similar to the TD literature, autistic offender research suggests that lower family income, parental conviction of violent crime and parental psychiatric history increased risk of violent offending (Heeramun et al., 2017). Helverschou et al. (2015) reported that nearly one third (29%) of offenders had been placed into foster or institutional care. Family violence, physical abuse, sexual abuse and neglect have also been reported to be experienced more frequently by autistic offenders compared to both autistic non-offenders and TD offenders (Kawakami et al., 2012; Kumagami & Matsuura, 2009). Neglect and physical abuse increased the likelihood of offending by 6.3 and 3.1 times respectively when compared to a non-offender autistic group (Kawakami et al., 2012).

Behavioural conduct factors

Conduct disorder is a diagnosis characterised by aggressive behaviour, deceitfulness, destructive behaviour or persistent/repetitive violation of the rules whereas attention deficit hyperactivity disorder is characterised by impaired attention and overactivity (World Health Organisation, 1992). Previous research has indicated that conduct disorder is highly associated with delinquency and offending (Boduszek, Belsher, Dhingra, & Iannou, 2014; Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011; Young, Taylor & Gudjonsson, 2016) whereas the research on ADHD is slightly more mixed with some illustrating increased risk (Gudjonsson, Sigurdsson, & Adalsteinsson, & Young, 2012; Lunström et al., 2014; Mannuza, Klein, Konig, & Giampino, 1989; Mannuzza, Klein & Moulton, 2008; Pratt, Cullen, Blevins, & Unnever, 2002) whereas others suggesting that co-morbid neurodevelopmental diagnoses (e.g., conduct disorder, oppositional defiant disorder) are what mediate this increased risk (Mannuzza et al., 2008; Mordre et al., 2011; Scatterfield et al., 2007).

Within an autistic offender sample, behavioural difficulties including verbal aggression (88%), physical aggression (75%), destructive behaviour (69%), displaying sexually inappropriate behaviour (69%) and overactivity (38%) were reported (Allen et al., 2008). Similarly to TD research, a large Swedish population-based autistic cohort (n = 5,739), reported that co-occurring ADHD and conduct disorder diagnoses largely explained the increased risk of violent offending risk and ASD actually served as a protective factor once ADHD and conduct disorder were taken into account (Heeramun et al., 2017). These factors, in addition to later onset psychiatric disorder and substance misuse, were the most important individual predictors of autistic violent offending (Heeramun et al., 2017). However, within non-offending autistic populations psychotic disorder is estimated to affect approximately 2-12% (Hofvander et al., 2009; Joshi et al., 2013; Lugnegård et al., 2011; Mukaddes et al., 2010) and personality disorder approximately 48-62% (Hofvander et al., 2009; Lugnegård, Hallerbäck & Gillberg, 2012). Thus, whilst these diagnoses may partly explain violent offending in ASD (Heeramun et al., 2017), their presence is not ubiquitous in autistic offending, and their prevalence in non-offending autistic populations indicates that they are neither necessary nor sufficient for an autistic individual to engage in violent offending.

Moral reasoning

Unsurprisingly, moral reasoning is an important factor in offending (Chen & Howitt, 2007). TD offenders frequently demonstrate poorer reasoning on moral tasks compared to non-offenders (e.g., Palmer, 2003; Palmer & Begun, 2006; Palmer & Hollin, 1998; Spenser et al., 2015), with moral reasoning being poorer on values applicable to offending behaviour (Palmer & Hollin, 1998). To date, there is no research examining moral reasoning in autistic offenders, however in non-offender samples, autistic individuals are reported to have moral reasoning impairments such as difficulties providing appropriate moral justifications and

evaluating the seriousness of transgressions (Buon et al., 2013; Senland & Higgin-D'Alessandro, 2013; Takeda, Kasai, & Kato, 2007; Zalla, Barlassina, Buon, & Leboyer, 2011). Thus, both TD offenders and autistic non-offenders show diminished moral reasoning, yet no research to date has examined whether moral reasoning also differs in autistic offenders.

In sum, mental health, substance use, family and childhood adversity, behavioural conduct factors and moral reasoning have all been widely shown to increase the likelihood of offending in TD populations. In addition, it is apparent throughout the literature that these factors are rarely independent of one another (e.g., relationships between psychopathology and substance abuse, and childhood abuse and psychopathology). This highlights the importance of a study which investigates each of these factors together, within a single sample. Whilst some research has investigated offending in ASD it is limited in scope, examining just a few of the above factors, using small sample sizes and/or a lack of matched comparison groups (e.g., age, gender, offence type). The aim of the present study was to investigate a wide range of risk factors within a large autistic offender sample, comparing results to three comparison groups (autistic non-offenders, TD offenders and TD non-offenders) in order to provide a more comprehensive understanding of the risk factors for offending in autistic individuals. It was predicted that autistic offenders would have higher scores (i.e., indicative of increased exposure or difficulties) than the autistic and TD non-offender samples in the mental health, substance use, family and childhood adversity and behavioural conduct domains. Autistic offenders were also expected to demonstrate lower scores than autistic and TD non-offenders on moral reasoning.

Method

Sample

Eighty autistic participants (40 offenders; 40 non-offenders) and 79 TD participants (40 offenders; 39 non-offenders) were recruited across England and Wales. Autistic and TD offenders were recruited from four prison establishments, two probation services, one approved premises and two secure hospitals. An a priori power analysis indicated that 159 participants were required to achieve 80% power for detecting a small effect size employing the statistical significance criterion of 0.05 (Cohen, 1992).

To recruit offender participants, approximately 50 premises (i.e., prisons, hospitals, approved premises) were contacted and those included reflect establishments who reported having both willing autistic participants and the resources to facilitate participation. Autistic non-offenders were recruited via the National Autistic Society (NAS) and the Research Autism website. TD non-offenders were largely recruited from recruitment agencies, local council facilities and non-academic departments at the University of Bath. An all-male sample was selected because approximately 95% of the prison population is male (Ministry of Justice, 2016).

Autistic offender participants were identified as having a formal diagnosis by staff with access to the offender's electronic notes. Whilst preferable for the researcher to see these diagnoses, ethics did not allow access to offenders' electronic notes to anyone outside of the CJS. Autistic non-offender participants were recruited from ASD-specific pathways (e.g., the National Autistic Society, Research Autism) and self-reported their diagnoses. Although it is a limitation of the research that independent diagnosis assessments were not carried out, CJS staff confirmed that the individuals had received an ASD diagnosis from a qualified professional. Subsequent inclusion criteria were that participants were aged 16 years or older and were deemed to have the capacity to consent (as initially indicated by staff and then determined at the point of informed consent). Exclusion criteria for the study were those

without a good understanding of the English language, active psychosis/psychotic illness, head injury and/or untreated epilepsy. TD individuals with an Autism Quotient 10 score above 6 were excluded.

Participants reported a range of offences which are summarised in Table 1. No significant difference was found between autistic and TD offenders on the type of offence that was committed (p = .295) using a Fisher's Exact Test.

Table 1. Index offences committed by autistic and TD offender participants

Offence	Autistic offenders	TD offenders
Violent offences (including robbery)	12	12
Sexual offences	19	16
Drug offences	1	5
Driving offences	1	1
Theft/Burglary	2	3
Public order offences	3	0
Arson	1	0
Fraud Offences	0	1
Missing	1	2
Total	40	40

Procedure

All participants completed the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 2011) 2 sub-test version, Autism Quotient 10 (AQ-10) (Allison, Auyeung & Baron-Cohen, 2012), Anti-Social Behaviour Subscale of the Self Report Psychopathy

Checklist III (SRP III) (Paulhus, Neumann, & Hare, in press), Offending Factors Questionnaire and the Socio Moral Reflection – Short Form (Gibbs, Basinger, & Fuller, 1992). An AQ-10 score of greater than 6 indicates that an ASD diagnostic assessment should be sought. This measure was used to ensure no TD participants demonstrated high autistic traits. The SRP III anti-social behaviour subscale was used to objectively quantify anti-social behaviours of the sample. Participants were assessed by the first author in a quiet location at a time and location that was convenient for both the participant and the establishment (where applicable). For the offender sample, assessments took place in the prison/probation service location. At all times safety procedures were adhered to, to ensure the safety of the researcher. Testing took approximately 45 to 90 minutes, but this varied between participants. As per the manual suggestions, a second coder (KM) coded 20 of the SMR-SF questionnaires and an acceptable inter-rater reliability was achieved ($\alpha = .80$).

Measures

The WASI II (Wechsler, 2011) 2 sub-tests include vocabulary (31 items) and matrix reasoning (30 items) tasks. The measure demonstrates good internal consistency (0.94) and acceptable to excellent concurrent validity to WASI I, WISC-IV and WAIS-IV (0.71-0.92) (Wechsler, 2011).

The Autism Quotient – 10 (Allison et al., 2012) is a 10-item pen-and-paper questionnaire which requires participants to indicate their agreement to 10 statements using a 4-point Likert scale (from definitely agree to definitely disagree). The AQ10 is a screening tool and if individuals score above 6 it is recommended that they are referred for an ASD diagnostic assessment. Good validity is demonstrated by the reported good sensitivity (0.88), specificity (0.91) and positive predictive value of 0.85 (Allison et al., 2012).

The Anti-Social Behaviour subscale of the Self Report Psychopathy Checklist III (SRP III) (Paulhus et al., in press) consists of 16 questions (e.g., I have never been involved in delinquent gang activity; I have never attacked anyone with the idea of injuring them). Questions are scored on a five-point Likert scale from strongly disagree to strongly agree. Six questions are reverse scored. Higher scores on the anti-social behaviour subscale are indicative of greater anti-social behaviour. The antisocial behaviour sub-scale demonstrates good alpha reliability (0.69 - 0.82; Gordts, Uzieblo, Neumann, Van den Bussche, & Rossi, 2017; Paulhus et al., in press; Sandvik et al, 2012). The antisocial behaviour subscale of SRP demonstrates moderate convergent validity with the anti-social facet of the PCL-R (0.66) (Sandvik et al, 2012) and the behavioural domain of the Comprehensive Assessment of Psychopathic Personality – Institutional Rating Scale (0.60) (Sandvik et al., 2012).

The Offending Factors Questionnaire (OFQ) was developed by the authors (see Appendix 1). Higher scores indicate greater number of items (e.g., mental health diagnosis, substance use) experienced. The questionnaire was informed by the TD offender literature and where available the autistic offender literature (outlined above), and was divided into four categories (see appendix for full details of the questionnaire items):

- *Mental health* (having a mental health diagnosis; support from mental health services; current and past use of medication for mental health).
- *Substance use* (drug use; alcohol use).
- *Family and childhood adversity factors* (social services involved during childhood; placed into the care of social services during childhood; Primary caregiver (PCG) mental health difficulties; PCG alcohol misuse; PCG drugs misuse; PCG convicted of crime; observed violence in family home; death of PCG as child; PCG divorce; extreme financial hardship; being bullied at school; hyperactive as a child).

- *Behavioural conduct factors* (bullied others at school; physical aggression; verbal aggression; destructive behaviour; sexually inappropriate behaviour; over-activity).

The OFQ demonstrated good reliability ($\alpha = 0.86$) and the behavioural sub-scale of the OFQ demonstrated moderate convergent validity with the anti-social behaviour subscale of the SRPIII (0.51). Future research should conduct more comprehensive validity assessments (e.g., using a wide range of additional measures and a range of participant groups).

The Socio-Moral Reflection Short Form (SMR-SF) (Gibbs et al., 1992) was used to assess moral reasoning. The measure contains 11 questions (e.g., how important is it for people to tell the truth?). Firstly, participants answer the question using a three-point Likert scale (very important; important, not important) and then they are asked to justify their answer. This justification is then scored and assigned a level (i.e., 1-4), with higher levels indicative of more mature moral reasoning. The levels progress from immature (e.g., concrete, superficial, concerned with physical power) to mature (e.g., consideration of interpersonal and societal relationships). The SMR-SF demonstrates a significant test-retest correlation of .88, good internal consistency of 0.92 and good concurrent validity with a number of measures of moral reasoning including the moral judgement interviews (0.69) (Gibbs et al., 1992) and the Sociomoral Reflection Objective Measures (0.71) (Ferguson, McIernon, & Cairns, 1994). The test has also successfully been implemented with offending populations (e.g., Chen & Howitt, 2007).

Data Analysis Plan

All data were normally distributed with all skewness values between 0.20 and 1.02 and kurtosis values between -1.26 and 0.57. First, two one way analysis of variance (ANOVA) analyses were run to evaluate the sample and to identify whether there were significant group differences on: (1) IQ; and (2) anti-social behaviour. Next, a one way analysis of variance (ANOVA) was run to identify whether there was a significant difference

between groups on total Offending Factors Questionnaire score before pairwise comparisons were run to investigate group differences. Finally, a multivariate analysis of variance (MANOVA) was run to identify the overall effect of group upon each of the five variables measured (the four subscales of the offending factors questionnaire: mental health, substance use, behavioural conduct, family/childhood; and the socio moral reflection score) before univariate tests and pairwise comparisons were run to explore group differences.

Ethics

At least two weeks prior to the study participants were given an information sheet and prior to participation participants written consent was obtained. Information and consent forms can be found in Appendix 2. Ethical approval was obtained from the University of Bath Department of Psychology Ethics Committee (ref no. 15-026), the National Offender Management Service (ref no. 2015-131) and the NHS Research Ethics Committee (ref no. 15/WA/0214).

Results

A one-way ANOVA indicated a main effect of group for full-scale IQ (FSIQ) scores, $F(3, 159) = 4.86$; $p < .01$, $\eta p^2 = .09$. Consistent with previous research, Tukey's post hoc tests revealed that autistic non-offenders had significantly higher FSIQ scores than TD offenders ($p < .01$), (Chiang, Tsai, Cheung, Brown, & Li, 2014; Hayes, Shackell, Mottram, & Lancaster, 2007). All other FSIQ comparisons were non-significant (all ps > .12). Groups did not significantly differ on age, $F(3, 159) = 1.65$, $p = .18$, $\eta p^2 = .03$, but as expected there was a main effect of group for AQ-10 scores, $F(3,159) = 35.23$, $p < .01$, $\eta p^2 = .41$: both the autistic offenders and autistic non-offenders had significantly higher AQ-10 scores than both TD offenders and TD non-offenders (ps < .01). No other comparisons were significant (ps > .11).

As expected a significant main effect of group was found on the anti-social subscale of the Self Report Psychopathy Checklist III (Paulhus et al., in press), $F(3, 156) = 34.687$, $p < .01$, $\eta p^2 = .405$ with both of the offender groups scoring significantly higher (i.e., more anti-social) than the non-offender groups (all *p*s <.001). No significant difference was found between autistic and TD offenders. These data are summarised in Table 2.

Table 2. Participant characteristics: Age, IQ, AQ10 and anti-social scores (standard deviations are in parentheses)

	Autistic offender	Autistic non-offender	TD offender	TD non-offender
n	40	40	40	39
Age	33.65 (11.37)	31.63 (12.44)	37.33 (15.31)	36.94 (14.17)
FSIQ-2	95.65 (17.49)	100.25 (16.00)	87.68 (14.62)	92.21 (12.38)
AQ-10	6.23 (2.58)	6.35 (2.52)	3.63 (1.31)	2.54 (1.23)
Anti-social behaviour	35.85 (9.16)	24.91 (8.34)	39.83 (9.92)	23.18 (7.06)

Investigating the effect of group on total offending factors questionnaire score, the ANOVA indicated a significant effect of group, $F(3, 91) = 8.72$, $p < .001$, $\eta p^2 = .231$. Bonferroni pairwise comparisons indicated that the autistic offenders scored higher on total score than both the autistic non-offenders ($p = .006$) and TD non-offenders ($p < .001$). All others *p*s > .071.

The MANOVA including the five variables (four offending factors sub-scales: mental health, substance use, behavioural conduct, family/childhood; and socio-moral reflection) demonstrated a significant overall multivariate effect, $F(15, 225) = 3.10$, $p < .001$, $\eta p^2 = .17$.

Figure 1 displays the mean totals for each group (autistic offender, autistic non-offender, TD offender and TD non-offender).

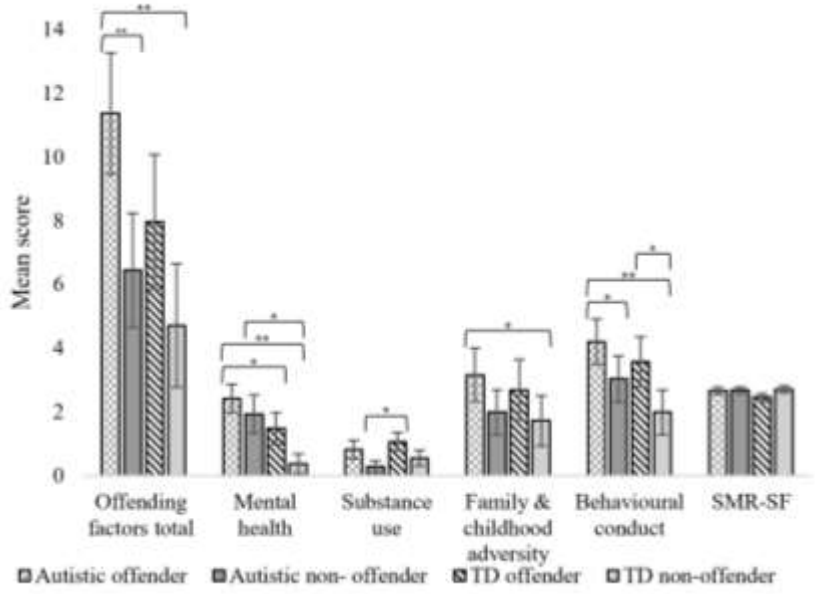

Figure 1. Mean scores for mental health, family, substance use, and behavioural conduct factors from the Offending Factors Questionnaire, and moral reasoning, with 95% confidence interval error bars. Higher scores on the offending factors questionnaire indicate that the individual has experienced greater number of difficulties, and higher scores on moral reasoning indicate more mature levels of moral reasoning.

* $p < .05$; ** $p < .01$

Univariate tests indicated a significant effect of group for each of the Offending Factors Questionnaire subscales: mental health, $F(3, 81) = 7.00$, $p < .001$, $\eta p^2 = .21$, substance use, $F(3, 81) = 4.61$, $p = .005$, $\eta p^2 = .15$, family and childhood adversity, $F(3, 81) = 3.39$, $p = .022$, $\eta p^2 = .12$ and behavioural conduct, $F(3, 81) = 9.59$, $p < .001$, $\eta p^2 = .27$. There was not a significant effect of group on the socio-moral reflection score, $F(3, 81) = 2.40$, $p < .074$, $\eta p^2 = .09$. Bonferroni pairwise comparisons for each subscale are described in turn below.

Mental health subscale

Results indicated that the autistic offenders scored higher on the mental health subscale than both the TD offenders (p = .046) and TD non-offenders (p < .001). The autistic non-offenders scored significantly higher than TD non-offenders (p = .030). All others ps > .321. Participants indicated a range of diagnoses which were categorised using ICD-10 classification system (e.g., depression was categorised in F30-F39; anxiety in F40-48). Diagnoses by group are displayed in table 3.

Table 3. Overview of diagnoses provided by participants

ICD-10 Codes	Autistic offender	Autistic non-offender	TD offender	TD non-offender
Schizophrenia, schizotypal & delusional disorders (F20-29)	3	0	0	0
Mood disorders (F30-39)	11	16	12	4
Neurotic, stress related & somatoform disorders (F40-48)	16	8	9	4
Behavioural & emotional disorders with onset usually occurring in childhood & adolescence (F90-98)	7	1	2	2
Disorders of adult personality & behaviour (F60-69)	12	0	2	0

Substance use subscale

Comparisons showed that only the autistic non-offender group scored lower than the TD offender group (p = .013) indicating less substance use. All others ps > .063.

Family & childhood adversity subscale

Autistic offenders scored significantly higher than the TD non-offender group (p = .020), suggesting the autistic offenders experience greater family and childhood adversity experiences (all other ps > .281).

Behavioural conduct subscale

Pairwise comparisons indicated that the autistic offenders scored higher than both the autistic non-offenders ($p = .019$) and TD non-offenders ($p < .001$) on the behavioural conduct subscale. The TD offenders scored significantly higher than the TD non-offenders ($p = .012$). All others *p*s > .114

Discussion

The aim of the present study was to investigate factors previously identified as differing between TD offender and non-offender samples (i.e., mental health, substance use, family and childhood adversity, behavioural conduct and moral reasoning) within a large autistic offender sample. This study compared autistic offenders to three comparison groups (autistic non-offenders, TD offenders and TD non-offenders) to provide a more comprehensive understanding of the potential risk factors for autistic offending. In summary, the results indicate a significant difference between autistic offenders and both of the non-offender samples (ASD; TD) on total offending factors questionnaire score (i.e., combined mental health, substance use, family and childhood adversity and behavioural conduct score). However, the only significant difference between autistic offenders and autistic non-offenders was on the behavioural conduct factor. No significant differences were identified between the autistic offenders and autistic non-offenders on the individual factors of mental health, substance use, family and childhood adversity or moral reasoning.

The current study found that TD offenders also scored higher than the TD non-offenders only on the behavioural conduct factor, which is in line with previous research (Mordre, Groholt, Kjelsberg, Sandstad & Myhre, 2011; Roberts et al., 2008; Young et al., 2016). No significant differences were identified between TD offenders and TD non-offenders on mental health, substance use, family and childhood adversity or moral

reasoning. This may reflect the mixed findings in TD offender research, or it may indicate that behavioural conduct factor is the most significant risk factor for offending in TD populations. Indeed, the only factor that the autistic offender and non-offender groups differed on was also the behavioural conduct factor. This finding is in line with previous research indicating increased physical and verbal aggression, destructive and sexually inappropriate behaviour in autistic offenders (Allen et al., 2008) and that conduct disorder and ADHD largely explained the increased violent offending observed in ASD (Heeramun et al., 2017). Previous research has demonstrated that the age at which events are experienced or behaviours occur may influence their impact on offending (Newman, Wanklyn, Ward, Cormier, & Day, 2015; Wanklyn et al., 2012) and further research is necessary to identify whether the age at which these behaviours first occur is also significant in offending in ASD. Overall however, it is suggested that individuals who are demonstrating behavioural conduct issues may be at greater risk of offending and warrant additional help and support to help prevent offending or re-offending.

Whilst the autistic offenders did not significantly differ from the autistic non-offenders on any further factors, the autistic offenders scored significant higher than TD non-offenders on mental health, family and childhood adversity and behavioural conduct factors. Of note is that both autistic groups (offenders and non-offenders) scored higher on the mental health subscale than did the TD non-offender group and the autistic offenders also scored higher than the TD offenders. The autistic offenders and non-offenders did not differ to each another. This suggests that mental health difficulties may be related to having an ASD diagnosis rather than offending status, although it is nevertheless important to be addressed within the CJS.

The significantly increased mental health difficulties observed within the autistic samples replicate previous non-offending autistic research (Belardinelli, Raza, & Taneli,

2016; Mazzone, Ruta, & Reele, 2012). Whilst there is limited research on the mental health of autistic offenders, Heeramun et al. (2017) suggest that psychopathology is a key factor in autistic violent offending. Most notable in the current research were the greater number of personality disorder (categorised in F60-69) and ADHD (categorised in F90-98) diagnoses in autistic offenders compared to autistic non-offenders. In TD offender's personality disorder has previously been implicated in violent crime (Craig et al., 2006; Desmarais et al., 2014; Silver et al., 2008) but not in sexual offending (Whitaker et al., 2008). The results here tentatively agree with the TD research with nearly 60% of autistic offenders diagnosed with personality disorder engaging in violent offending. Previous research on ADHD with TD offenders produced more mixed results with some research indicating the diagnosis increased offending risk (e.g., Gudjonsson, Sigurdsson, & Adalsteinsson, & Young, 2012; Lunström et al., 2014; Mannuza, Klein, Konig, & Giampino, 1989; Mannuzza, Klein & Moulton, 2008; Pratt et al., 2002) whereas others indicating comorbid diagnoses mediate this risk (Mannuzza et al., 2008; Mordre et al., 2011; Scatterfield et al., 2007). In a violent offending autistic sample ADHD has been suggested to mediate the relationship between ASD and offending (Heeramun et al., 2017). The current research found ADHD diagnoses in violent offenders but also those who committed public order, driving and sexual offences. This suggests that the relationship between ADHD and offending may extend beyond violent offending to include a wider range of offence classifications.

Whilst higher mental health scores (i.e., indicative of more comorbid diagnoses, medication requirements and psychological input) in ASD may initially seem like a negative finding it does suggests that individuals are receiving diagnoses, support and medication for their mental health difficulties. Whilst mental health did not differentiate autistic offenders and autistic non-offenders, findings suggest that autistic offenders are known to services which may prove important to both preventing either initial offending or re-offending. With

increased knowledge and understanding of risk factors or warning signs for offending (e.g., co-morbid personality disorder or ADHD, behavioural conduct issues), autistic offenders could be closely monitored as to whether or not they exhibit these risk factors for offending. Interventions could then be implemented which could help to prevent autistic individuals from offending.

Although substance use did not differentiate between autistic offenders and non-offenders this result was nearing significance (p = .063). Until recently, it was hypothesised that autistic individuals were less likely to use substances (Santosh & Mijovic, 2006; Sizoo van der Brink, Gorissen van Eenige, & Jan van Gaag, 2009) however, research has indicated that some autistic individuals actually may be at increased risk of substance disorder (Butwicka et al., 2017). The TD literature has highlighted an increased prevalence of substance use in TD offending populations (Bebbington et al., 2017; Fazel et al., 2006; Murray et al., 2013; Tharp et al., 2012) which the current research suggests may also be a red flag for autistic offending. In addition, TD literature has identified a link between mental health and substance use (Flynn, Rodway, Appleby, & Shaw, 2014) which is noteworthy given the greater mental health difficulties that autistic individuals reported within this study. Research suggests that some autistic individuals may use substances to self-medicate to cope with or alleviate the co-occurring symptoms of anxiety, depression and ADHD (Clarke et al., 2016; Rengit et al., 2016). Whilst autistic offenders in this sample did not report significantly more anxiety or depression diagnoses than autistic non-offenders, only one autistic non-offender reported an ADHD diagnosis compared to six autistic offenders potentially further highlighting the mediating effect of ADHD in autistic offending as previously reported by Heeramun et al. (2017). However, further research into the ASD use of self-medication using drugs and alcohol on offending behaviours is required.

TD offender populations have previously been found to demonstrate lower levels of moral reasoning compared to TD non-offenders (Palmer & Begun, 2006; Spenser et al., 2015). This was not supported by the current research. Previous research has not examined the moral reasoning abilities of autistic offenders but has reported autistic non-offenders to moral reasoning impairments (Buon et al., 2013; Senland & Higgin-D'Alessandro, 2013; Takeda, Kasai, & Kato, 2007; Zalla, Barlassina, Buon, & Leboyer, 2011) with difficulty providing appropriate moral justifications and evaluating the seriousness of transgressions (Zalla et al., 2011). The current research suggests that autistic offenders do not significantly differ in their moral reasoning abilities when compared to non-offender groups. This suggests that autistic offending behaviour may not be based upon moral reasoning impairments. Alternatively, participants may have completed the task before so demonstrated practise effect or autistic individuals may be able to pass moral reasoning tasks on paper but this understanding does not transfer to the real world. The static nature of this task is a real limitation of this study. Within this study, participants were given as much time as they needed to read, consider and complete the moral reasoning task, whereas in a real world scenario individuals may have to decide on a moral action (i.e., offend or not offend) quickly. Future research should look to use a more dynamic, video based assessment with an imposed time limit to measure real life moral reasoning abilities.

Further limitations of this study include that the mental health, substance use, family and childhood adversity and behavioural conduct factors were all based upon self-report. A recent review of the literature identified that autistic individuals typically demonstrate impairments in self-awareness and insight (Huang et al., 2017) which may help to explain the mixed findings found for the use of self-report tools in ASD. Some research suggests that autistic individuals can successfully complete self-report tasks (e.g., Hesselmark, Eriksson, Westerlund, & Bejerot, 2015), whereas others suggest that autistic individuals have problems

in responding to questions, quantifying experience (e.g., choosing between agree or strongly agree), expressing themselves and can under-report their difficulties (Findon et al., 2016; Hesselmark, Plenty, & Bejerot, 2013; Mazefsky, Kao, & Oswald, 2011; Shalom et al., 2006). Additional research suggests that it is the nature of the behaviours reported that influences autistic individuals ability to self-report (Adams, Fredstron, Duncan, Holleb & Bishop, 2014). In addition, it may be helpful for future research to consider including parents or caregivers to provide details (e.g., about childhood behaviour or experiences) as the participants themselves may have difficulty with this. Inter-rater reliability analyses can then be run to determine correlations between parents and autistic participants.

Another related limitation of this research is the use of checklists not validated for individuals with ASD. In order to attempt to control for this, the measures chosen (e.g., SRP III) or written (i.e., OFQ) were those considered to be easier for individuals with ASD to understand (i.e., clear, succint, literal statements). However, future research should conduct validation studies using autistic individuals using measures frequently employed within offender research. The next limitation was that it was not possible to do ASD diagnostic assessments to check the individuals ASD diagnoses, or access the individuals' medical notes. Whilst TD individuals who scored greater than 6 on the AQ10 were excluded from the research, this is not a perfect solution. In future, research should conduct ASD diagnositic assessments with all participants to confirm or deny ASD/TD status.

Furthermore, the OFQ, whilst based exclusively on the literature and the questions were designed with autistic individuals in mind (e.g., use of literal and unambiguous language), this is a new questionnaire which has not been widely used or tested previously. Finally, the low levels of mental health diagnoses (e.g., only two TD offenders had a diagnosis of personality disorder; 5%) may question whether this sample is representative of the TD offender population as previous research has found much higher levels of mental

health difficulties (e.g., PD prevalence of 36-37%: Bebbington et al., 2017; Roberts et al., 2008). The limitations discussed within this section may limit the ability to generalise the findings of this paper.

Given the lack of differences found between autistic offenders and autistic non-offenders on mental health, substance use, family and childhood adversity and moral reasoning, future research should interview the autistic offenders to try to understand their motivations for engaging in offending. Previous review of psychiatric forensic reports identified idiosyncratic reasons as the most commonly reported reason for autistic offending (Helverschou et al., 2015). Future research should interview autistic offenders to understand these distictly individual offending motivations. This can then be used to not only identify individuals at risk of offending but also could be used to help develop recidivism prevention tools. Future research should also look to understand the nature of offending in autism (i.e., do individuals offend alone or with others) and whether more ASD specific factors predict the offending behaviour (e.g., social motivation, ToM). Finally, it is important to note that the majority of autistic individuals are law abiding (Frith, 1991; Murrie, Warren, Kristianssen & Dietz, 2002) and it be helpful for future research to investigate the reasons why most autistic individuals desist from offending, despite having some of the reported risk factors for offending.

In conclusion, behavioural conduct factors appear to differentiate both autistic and TD offenders from non-offenders (both ASD and TD). Mental health, however, was found to differentiate the autistic groups (offender; non-offender) from the TD groups, suggesting that mental health is reflective of the ASD diagnosis. Given the lack of factor differentiation (i.e., mental health, substance, family and childhood adversity and moral reasoning) between the autistic offenders and non-offenders future research should consider more ASD-specific as well as individual factors in order to identify differences between autistic individuals who

offend and those who do not. This knowledge can then be used to develop interventions to help prevent offending behaviours.

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Post Academic Paper One Commentary

This thesis aims to improve understanding of offending behaviours and the autism spectrum by conducting theory informed research. The typically offender literature is significantly more developed that the autistic offender literature, thus Chapter Two predominantly used the TD literature to identify characteristics associated with offenders. The autistic offender literature was addressed where available. Consequently, the study presented in Chapter Two addressed the research question: Are there any significant differences in profiles (i.e., mental health, substance, family and childhood, behavioural conduct and moral reasoning) between autistic offenders and: (a) autistic non-offenders; (b) TD offenders; and (c) TD non-offenders?

The findings indicate that autistic offenders have the highest Offending Factors Questionnaire Score and that the score was significantly higher than both non-offending groups (ASD, TD), however, there was no significantly difference between the offender groups (ASD, TD). In summary, none of the factors significantly differed between offenders on the autism spectrum and all of the three comparison groups (autistic non-offenders, TD offenders, TD non-offenders). This suggests that further research is necessary to explore whether autistic offenders differ from comparison groups in other ways.

Chapter Three

Lone versus co-offending in autism: Evaluation of social vulnerability, compliance, theory of mind, social motivation, and restricted interests and repetitive behaviours in autistic offenders

Chapter Rationale

The research presented in Chapter Two used a combination of The Offending Factors Questionnaire (which measured mental health, substance use, family and childhood adversity factors and behavioural conduct) and the Socio Moral Reflection Short Form (Gibbs et al., 1992). Although the Offending Factors Questionnaire total was found to be highest in autistic offenders, no significant differences were identified between the autistic offenders and TD offenders. The factors previously associated with typically developed offending measured in Chapter Two (i.e., mental health comorbidity, substance use, family and childhood experiences, behavioural difficulties and moral reasoning) did not significantly differ between autistic offenders and all three comparison groups (autistic non-offenders; TD offenders; TD non-offenders). Mental health was typically associated with the ASD diagnosis whereas behavioural conduct was associated with being an offender however no factor distinguished the autistic offenders from all of the three comparison groups. In order to improve understanding of factors that may differentiate the autistic offenders from all three comparison groups (autistic non-offenders, TD offenders; TD non-offenders), Chapter Three looked at factors more specifically associated with ASD (e.g., theory of mind (ToM); social motivation; restricted interests and repetitive behaviours) to identify whether these could effectively differentiate the groups. Furthermore, to further improve understanding of offending across the spectrum, the method of offending that offenders typically engaged was measured (i.e., lone or co-offending) and the effect of the measured variables (i.e., social

vulnerability, compliance, ToM, social motivation, restricted interests and repetitive behaviours) on the method of offending (i.e., lone or co-offending) was investigated.

This declaration concerns the article entitled:									
Lone versus co-offending in autism: Evaluation of social vulnerability, compliance, theory of mind, social motivation, and restricted interests and repetitive behaviours in autistic offenders									
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Candidate's contribution to the paper (detailed, and also given as a percentage).	The candidate predominantly executed the: Formulation of ideas: Predominantly executed (90%) Design of methodology: Predominantly executed (90%) Experimental work: Predominantly executed (95%) Presentation of data in journal format: Predominantly executed (90%)								
Statement from candidate:	This paper reports on original research I conducted during the period of my higher degree by research candidature.								
Signed						Date	19/08/2018		

Abstract

Research suggests that autistic individuals have social and cognitive vulnerabilities which might heighten their vulnerability to undue influence by others, both in the general population and within the Criminal Justice System, which may result in greater rates of offending with others (co-offending). Alternatively, decreased social motivation and increased restricted interests and repetitive behaviours (RIBs) may result in increased offending alone (lone-offending). The present study found that autistic offenders were significantly more likely to engage in lone offending than co-offending but did not differ from autistic non-offenders on social vulnerability, compliance, Theory of Mind, social motivation or RIBs. These factors did also not predict lone or co-offending. Future research should investigate the motivations for autistic offenders engaging in more lone offending.

Keywords

Autism, offending; criminal justice system; social vulnerability; theory of mind; compliance; social motivation; restricted interests; repetitive behaviours

Lone versus co-offending in autism and the role of social vulnerability, compliance, theory of mind, social motivation, and restricted interests and repetitive behaviours in offending behaviours

Autism Spectrum Disorder (ASD) is characterised by persistent deficits in social communication and interaction coupled with restricted/repetitive patterns of behaviour, interests or activities (American Psychiatric Association, 2013). Whilst ASD is thought to occur in around 1% of the general population (Baird et al., 2006; Brugha et al., 2011), its prevalence has been estimated to be up to four and a half times greater in the prison population (Fazio, Pietz, & Denney, 2012; Robinson et al., 2012), and up to three times greater in secure hospital/forensic psychiatric service populations (Hare, Gould, Mills & Wing, 1999; Scragg & Shah, 1994; Siponmaa, Kristiansson, Jonson, Nydén & Gillberg, 2001; Soderstrom, 2005).

The limited existing research to date suggests that, compared to TD offenders, autistic offenders[2] engage in more crimes against the person such as assault, robbery and sexual offences (Cheeley, Carpenter, Letourneau, Nicholas, Charles, & King, 2012; Kumagami & Matsuura, 2009), and fewer non-person orientated crimes such as burglary, arson and trespass, driving offences, and drug offences (Cheeley et al., 2012; Kumagami & Matsuura, 2009; Mouridsen, Rich, Isager, & Nedergaard, 2008). Despite the overall reported increased prevalence of ASD within forensic settings, relatively little is known about the characteristics of autistic offenders and whether they typically engage in lone or co-offending, which is pertinent for better understanding offending in ASD to enable the development of effective interventions to prevent initial offending and re-offending.

[2] Identity first language is principally used within this paper when referring to individuals diagnosed with ASD. 'Autistic' was the term preferred by many autistic individuals within the UK when asked to choose one term to describe themselves. We are however respectful that this is not a unanimous opinion throughout the autism community (see Kenny et al., 2016).

Lone offending refers to offences committed by one person whereas co-offending refers to crimes committed by two or more people (Weerman, 2003). Despite lone and co-offending frequently being documented as methods of crime, relatively few empirical studies exist on this topic (van Mastrig & Farrington, 2009) (e.g., to understand the reasons why each is chosen). Co-offending is suggested to be more common for younger offenders (Park & Kim, 2016; Weerman, 2003) and in crimes such as vandalism, drug use and property offences (Weerman 2013), and is less frequently associated with general assault and other violent crimes, minor thefts and shoplifting (Weerman, 2003). Given the reported decreased prevalence of property crimes and drugs offences coupled with the suggested increased prevalence of crimes against the person in autistic offenders (Cheeley et al., 2012; Kumagami & Matsuura, 2009; Mouridsen, Rich, Isager, & Nedergaard, 2008) it could be hypothesised that autistic offenders may be more likely to engage in lone rather than co-offending. Furthermore, diminished social motivation (i.e., decreased motivation to engage in social processing, Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012); or restricted or repetitive interests (APA, 2013; World Health Organisation, 2018) may also increase the risk of lone offending.

Multifarious factors for autistic individuals engaging in offending have been reported, including obsessional interests, misunderstanding rules and social situations, relative impairments in theory of mind (ToM), a lack of concern or awareness of outcomes, impulsivity and idiosyncratic beliefs (e.g., Allen et al., 2008; Brewer & Young, 2015; Helverschou et al., 2015; Katz & Zemischlany, 2006; Murrie et al., 2002). The literature indicates some factors that would predict greater co-offending in ASD (such as social vulnerability, compliance and theory of mind (ToM) but others that would predict greater lone offending in ASD (such as social motivation and restricted interests and repetitive behaviours).

Nevertheless, research to date has not attempted to distinguish lone and co-offending in autistic offenders. This is an important factor to consider given that research suggests that autistic individuals may be subject to undue influence from others (e.g., Sofronoff et al., 2011; North et al., 2008). Autistic individuals may also be more vulnerable to exploitation by others within a criminal environment (Brewer & Young, 2015; Faccini & Allely, 2017; Hare et al., 1999) which further highlights the importance of gaining a better understanding of this topic. Indeed, social vulnerability (that is, difficulty detecting or avoiding potentially harmful interpersonal interactions; Pinsker, Stone, Pachana, & Greenspan, 2006) has been shown to be heightened in autistic children compared to their typically developing (TD) peers (Sofronoff, Dark, & Stone, 2011). Although not examined within an autistic adult population to date, a lack of understanding about interpersonal occurrences may result in an autistic individual failing to question the intentions or honesty of an individual who is befriending them. Thus, this may lead autistic offenders to be more easily misled to engage in deviant behaviours in the presence of others.

Similarly, compliance, which is the likelihood that an individual will yield to pressures applied by others (Gudjonsson 1989), may also be higher in ASD. Three studies to date have examined compliance in non-offender samples of autistic adults. Using the informant reported version of the Gudjonsson Compliance Scale (GCS) (Gudjonsson, 2003), a form comprising 20 true-false statements measuring an individual's tendency or eagerness to please others, North, Russell, and Gudjonsson (2008) reported significantly higher compliance in autistic adults compared to their TD counterparts. However, Maras and Bowler (2012) found no difference between autistic and TD adults using a self-report version of the same scale, which may be reflective of either the heterogeneity between samples (nearly 30% of the autistic participants in North et al. (2008) were inpatients on a specialist unit for autistic people, suggesting many participants were experiencing a range of complex

emotional difficulties) or underlying difficulties with self-report in ASD (e.g., Mazefsky, Kao, & Oswald, 2011). Research using both self-report (GCS) and a behavioural measure of compliance (i.e., to go along with an unreasonable request) demonstrated heightened compliance in autistic adults (Chandler, Russell & Maras, in press). Within TD offender populations, compliance is strongly related to individuals being pressured into committing crimes to please others (Gudjonsson & Sigurdsson, 2004; Gudjonsson & Sigurdsson, 2007). Further investigation with an autistic offender population is warranted, as findings could have significant implications in understanding their motivations for engaging in offending behaviours.

ToM is the ability ascribe mental states to oneself and others (Premack & Woodruff, 1978) which enables us to interpret and predict the behaviours of others (Baron-Cohen, 1997). Both autistic non-offender (Baron-Cohen, Leslie & Frith, 1985; Pedreno, Pousa, Navarro, Pamias & Obiols, 2017; Schuwerk, Vuori, & Sodian, 2015; Woodbury-Smith, Clare, Holland, Kearns, Staufenberg & Watson, 2005) and TD offender populations (Castellino, Bosco, Marshall, Marshall & Veglia, 2011; Elsegood & Duff, 2010; Spenser, Betts & Gupta, 2015) have demonstrated relative impairments in ToM. However, evidence regarding the ToM abilities of autistic offenders is mixed (Chesterman & Rutter, 1993; Kohn et al., 1999; Woodbury-Smith et al., 2005). Since ToM is positively associated with identification of suspicious, dodgy and criminal behaviour (Brewer, Ying, Young & Nah, 2018) this may leave some autistic individuals open to being drawn into illicit relationships and deceived into committing offences with or on behalf of others, particularly when coupled with social naivety and misinterpretation of relationships (Archer & Hurley, 2013; Blackburn & Howlin, 2004; Brewer & Young, 2015; Murrie, Warren, Kristiansson & Dietz, 2002; Yang et al., 2017).

While heightened social vulnerability, increased compliance and diminished ToM may result in an increased propensity to be led astray to offend with others, decreased social motivation and increased restricted interests may mitigate these vulnerabilities and manifest as relatively greater rates of lone offending in autistic offenders. The social motivation hypothesis suggests that autistic individuals have decreased motivation to engage in social processing (Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012). That is, at a behavioural level, autistic individuals are less likely to orient to people and seek out, enjoy and work to maintain social/interpersonal relationships (Chevallier et al., 2012, but see Bauminger et al., 2004; Mazurek, 2014; White & Roberson-Nay, 2009). Co-offending is suggested to be an outcome of group influence and processes (e.g., social learning, the social rewards outweighing the risks, expectations by other group members) (Weerman, 2003) which coupled with the social motivation theory suggests that autistic offenders may be less likely to engage in co-offending and more likely to engage in lone offending. In addition, within non-offender autistic populations, increased restricted/circumscribed interests have been suggested to lead to a lack of interest in engaging with others about topics outside of their specific interest and ultimately social communication and interaction difficulties (Cho et al., 2017; Turner-Brown et al., 2011). These findings suggests that autistic offenders may be more likely to engage in lone offending.

The current study aimed to clarify the type of offending autistic individuals engage in (i.e., lone or co-offending) and to disentangle the role of social vulnerability, compliance, ToM, social motivation and restricted interests and repetitive behaviours by comparing four large groups of participants (autistic offenders; autistic non-offenders; TD offenders; TD non-offenders). It was predicted that both autistic (offender and non-offender) groups would score higher on social vulnerability, compliance, and restricted interests, and lower on ToM and social motivation than TD groups; but that these differences would be greater in the autistic

offender than the autistic non-offender group. Directional predictions were not made regarding whether autistic offenders were more likely to engage in lone or co-offending, but we did expect that greater social vulnerability, compliance and diminished ToM would predict co-offending, whereas decreased social motivation and increased restricted interests and repetitive behaviours would predict a greater likelihood of lone offending.

Method

Sample

Across England and Wales, eighty autistic participants (40 offenders; 40 non-offenders) and 79 TD participants (40 offenders; 39 non-offenders) were recruited. An a priori power analysis suggested that 67 participants were required to achieve Cohen's (1992) recommended 80% power for detecting a large effect size, using the statistical significance criterion of 0.05.

All participants were male to reflect the finding that 95% of the prison population is male (Ministry of Justice, 2016). Offenders were recruited from four prison establishments, two probation services, two secure hospitals and one approved premises. In total, approximately 50 premises (i.e., prisons, hospitals, probation services, approved premises) were contacted. Non-offending autistic participants were recruited via the National Autistic Society (NAS) and Research Autism website. The TD non-offenders were recruited from a range of locations (e.g., recruitment agencies, local council facilities, non-academic departments at the University of Bath).

Whilst it was not possible to access offenders notes due to ethical approval limitations and establishment requirements, the autistic offender participants were identified as having a formal diagnosis by staff with access to the offender's notes. Autistic non-offender participants were recruited from ASD-specific pathways (e.g., the National Autistic Society,

Research Autism) and self-reported their diagnoses. TD participants who scored above 6 on the Autism Quotient 10 (i.e., indicative of high autistic traits) were excluded. Subsequent inclusion criteria were that participants were aged 16 years or older and were deemed to have the capacity to consent (as initially indicated by staff and then determined at the point of informed consent). Exclusion criteria for the study were those without a good understanding of the English language, active psychosis/psychotic illness, head injury and/or untreated epilepsy.

The participants reported a number of index offences which are detailed in Table 1 however, no significant differences in index offence were found between autistic and TD offenders (p = .295) using a Fisher's exact test.

Table 1. Breakdown of index offences committed by autistic and TD offender participants

Offence	Autistic offenders	TD offenders
Violent offences (including robbery)	12	12
Sexual offences	19	16
Drug offences	1	5
Driving offences	1	1
Theft/Burglary	2	3
Public order offences	3	0
Arson	1	0
Fraud Offences	0	1
Missing	1	2
Total	40	40

Procedure

Participants completed the Wechsler Abbreviated Scale of Intelligence (WASI), Autism Quotient 10 (AQ-10) (Allison, Auyeung & Baron-Cohen, 2012), the Anti-Social Behaviour Subscale of the Self Report Psychopathy Checklist III (SRP III) (Paulhus et al., in press), The Social Vulnerability Scale (Pinsker et al., 2006), The Gudjonsson Compliance Scale Form D (Gudjonsson, 1997), The Strange Stories Test (Happé, 1994) and both the social motivation subscale and the restricted interests and repetitive behaviour subscale from the Social Responsiveness Scale (SRS: Constantino & Gruber, 2012). The AQ-10 was used to ensure no TD participants scored higher than the threshold indicating an ASD diagnosis should be investigated. TD individuals with an AQ score above 6 were excluded. The anti-social behaviours of the participants were quantified using the SRP III. Individuals were assessed by the first author at a pre-agreed time and location that was convenient for the participant and establishment (where applicable). Offenders assessments took place within the prison/probation service location. Testing varied between participants but took between 45 to 90 minutes including background assessments (e.g., the WASI).

Measures

The Wechsler Abbreviated Scale of Intelligence II (WASI II; Wechsler, 2011) is a measure of intelligence consisting of two sub-tests: (1) vocabulary (31 items); and (2) matrix reasoning (30 items). The test demonstrates good reliability and validity with good internal consistency (0.94) and good ranges of concurrent validity to the WAIS-IV, WASI I & WISC-IV and WAIS-IV (0.71-0.92) (Wechsler, 2011).

The Autism Quotient – 10 (Allison et al., 2012) is an autism screening tool consisting of 10 items requiring participants to indicate their agreement to 10 statements using a 4-point Likert scale (from definitely agree to definitely disagree). It is recommended that individuals are referred for an ASD diagnostic assessment if they score over 6. The measure

demonstrates good specificity (0.91), sensitivity (0.88) and positive predictive value (0.85) (Allison et al., 2012).

The Anti-Social Behaviour subscale of the Self Report Psychopathy Checklist III (SRP III) (Paulhus et al., in press) is a 16 item sub-scale which includes terms such as, "I have never been involved in delinquent gang activity". Individuals indicate their agreement with the statements using a 5-point Likert scale ranging from strongly disagree to strongly agree. Six questions are reverse scored. Higher scores on the anti-social behaviour subscale are indicative of greater anti-social behaviour. The measure demonstrates good alpha reliability values of between 0.69 and 0.82 (Gordts, Uzieblo, Neumann, Van den Bussche, & Rossi, 2017; Paulhus et al., in press; Sandvik et al, 2012) and moderate convergent validity to both the anti-social facet of the PCL-R (0.66; Sandvik et al, 2012) and the behavioural domain of the Comprehensive Assessment of Psychopathic Personality – Institutional Rating Scale (0.60) (Sandvik et al., 2012).

The Social Vulnerability Scale (Pinsker et al., 2006) is a 15-item self-report measure in which participants indicate their agreement with statements (e.g., "to the best of your knowledge, how often have you or would you believe what you are told by others even if they have deceived you in the past") on a 5-point Likert scale (from never to always). Answers are scored from zero to four. The questionnaire demonstrates good internal consistency of 0.88-0.90 and test-retest correlation of 0.87 (Pinsker et al., 2011). The social vulnerability scale also demonstrates good construct and face validity (Pinsker et al., 2011). Higher scores indicate increased social vulnerability.

The Gudjonsson Compliance Scale (Gudjonsson, 1997) *Form D* is a 20-item self-report questionnaire requiring participants to answer true or false to each statement (e.g., *"I find it very difficult to tell people when I disagree with them*"). Several items are reverse scored. The questionnaire demonstrates acceptable reliability of 0.71,good test re-test

correlation of 0.88 and significant concurrent and construct validity to other measures such as the Social Conformity Scale (Pettigre, 1958), the Marlow Crowne test of social desirability (Crowne & Marlow, 1960) and the Acquiescence Scale (Winkler, Kanouse & Ware, 1982) (Gudjonsson, 1989). Higher scores indicate greater compliance.

The Strange Stories test (Happe, 1994) is a measure of ToM comprising a series of short vignettes where the character says something that is not literally true. Participants are asked to indicate whether the utterance is true and then asked to explain why the character said what they said. Twelve items from the full 24 story set were used in this study (one of each story type) due to time constraints. Participants' responses were scored to indicate both whether the justification for the character's behaviour is correct or incorrect but also whether these justifications are mental or physical justifications. The number of omissions were also recorded. The measure demonstrates good internal consistency (0.73) and significant convergent validity to other ToM measures such as the Reading the Mind in the Eyes test (Baron-Cohen et al., 2001; Hayward & Homer, 2017). Answers indicative of more developed ToM are those that provide more correct mental justifications.

The Social Motivation Scale is a subscale taken from the Social Responsiveness Scale (Constantino & Gruber, 2012). The sub-scale has 10 items which ask participants to identify on a four-point Likert scale (from not true to almost always true) the response that best describes their behaviour over the past six months (e.g., *"I am much more uncomfortable in social situations than when I am by myself"*). The SRS has demonstrated good sensitivity values of 0.74-0.80 and good specificity values of 0.69-1.00 in autistic samples (Bölte, Westerwalk, Holtmann, Frietag, & Poustka, 2011). Higher scores on the scale indicate diminished social motivation.

The Restricted Interests and Repetitive Behaviour Scale is a subscale taken from the Social Responsiveness Scale (SRS: Constantino & Gruber, 2012). This scale has 12 items

which ask participants to identify on a four-point Likert scale (from not true to almost always true) the response that best describes their behaviour over the past six months (e.g., *"I think or talk about the same thing over and over"; "I can't get my mind off something once I start thinking about it"*). The SRS has demonstrated good sensitivity values as indicated above (Bölte et al., 2011). Higher scores on the scale indicate increased restricted interests and repetitive behaviours.

Lone/co-offending questionnaire. This questionnaire was developed specifically for this study. It includes 12 items which ask about the crime committed, whether the crime was committed alone or with others and the role of the other people (e.g., "*was the other person with you at the time and scene of the crime?*"), the nature of this interaction (e.g., *"did someone ask you to commit the crime?"*) and whether this was the first crime that the participant had committed. The questionnaire was designed by individuals experienced with ASD to be accessible for autistic individuals (i.e., questions were short, literal and clearly worded). A full list of questions can be found in Appendix 3. Total scores were not calculated; rather, the questionnaire was devised to elicit information initially about whether the offence was conducted as a lone or co-offence and to profile the relationship between co-offenders where applicable. The questionnaire was considered to have good face validity as it appeared to effective in measuring the lone/co-offending nature of offending. Despite this, future research should conduct validation studies to ensure that this is an effective measure for all groups (e.g., autistic offenders, TD offenders).

Data Analysis Plan

All data were normally distributed with all skewness values between -1.54 and 1.27 and kurtosis values between -0.60 and 1.94. Two separate one-way analysis of variance (ANOVA) analyses were run to identify whether there were significant group differences on either IQ or anti-social behaviour. Next, a one-way multivariate analysis of variance was run

to examine the overall combined effect of the five variables measured (social vulnerability, compliance, ToM, social motivation, restricted interests and repetitive behaviours). Univariate tests were then inspected to identify any significant variables before running pairwise comparisons to explore between group differences. A Chi-Squared analysis was carried out with the two offender groups (autistic; TD) to identify whether there was a significant difference in lone and co-offending. Due to the low numbers of autistic co-offenders (see results section below), the autistic and TD offender data were combined and a logistic regression was run to identify whether the five measured variables (social vulnerability, compliance, ToM, social motivation, restricted interests and repetitive behaviours) predicted lone or co-offending.

Ethics

All participants received the information sheet at least two weeks prior to testing. Before participation, written consent was obtained from each participant. The information and consent forms can be found in Appendix 2. Ethical approval was gained from the University of Bath Department of Psychology Ethics Committee (ref no. 15-026), the National Offender Management Service (ref no. 2015-131) and the NHS Research Ethics Committee (ref no. 15/WA/0214).

Results

A one-way ANOVA indicated a main effect of group for full-scale IQ (FSIQ) scores, $F(3, 155) = 4.864$; $p = .003$, $\eta p^2 = .086$. Tukey's post hoc tests revealed that autistic non-offenders had significantly higher FSIQ scores than TD offenders ($p = .002$). This is consistent with previous research showing that TD offenders have significantly lower IQ than non-offenders (Chiang, Tsai, Cheung, Brown, & Li, 2014; Hayes, Shackell, Mottram, & Lancaster, 2007).

All other FSIQ comparisons were non-significant (all *p*s > .122). Groups did not significantly differ on age, $F(3, 155) = 1.65$, $p = .181$, $\eta p^2 = .03$, but as expected there was a main effect of group for AQ10 scores, $F(3,155) = 35.23$, $p < .001$, $\eta p^2 = .41$: both the autistic offenders and autistic non-offenders had significantly higher AQ10 scores than both TD offenders and non-offenders (*p*s < .001). No other comparisons were significant (*p*s > .108). Finally, there was a significant effect of group on anti-social behaviour, $F(3,153) = 34.69$, $p < .001$, $\eta p^2 = .41$: both offender groups scored significantly higher than the two non-offender groups (*p*s < .001). No significant difference was observed between the offender groups ($p = .262$). The resultsdata are summarised in Table 2.

Table 2. Participant characteristics: Age, IQ, AQ10 and anti-social behaviour scores (standard deviations are in parentheses) (as seen in Chapter 2 and see Payne, Maras, Russell & Brosnan., in preparation).

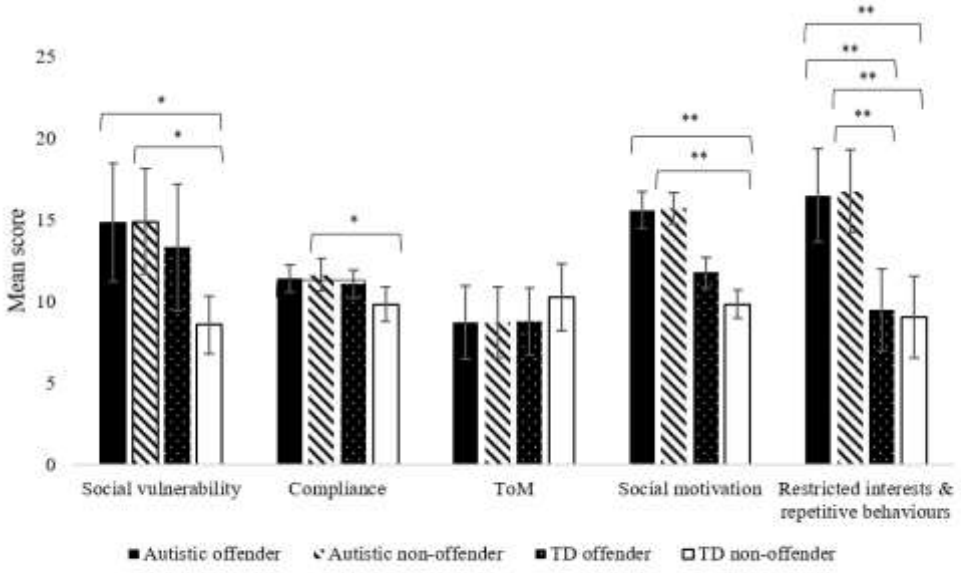
	Autistic offender	Autistic non-offender	TD offender	TD non-offender
n	40	40	40	39
Age	33.65 (11.37)	31.63 (12.44)	37.33 (15.31)	36.94 (14.17)
FSIQ-2	95.65 (17.49)	100.25 (16.00)	87.68 (14.62)	92.21 (12.38)
AQ10	6.23 (2.58)	6.35 (2.52)	3.63 (1.31)	2.54 (1.23)
Anti-social behaviour	35.85 (9.16)	24.91 (8.34)	39.83 (9.92)	23.18 (7.06)

Social vulnerability, compliance, ToM, social motivation and restricted interests and repetitive behaviours

A multivariate analysis of variance indicated a significant overall multivariate effect of group (autistic offender; autistic non-offender; TD offender; TD non-offender) on social vulnerability, compliance, ToM, social motivation, and restricted interests and repetitive behaviours scores, $F(15, 414) = 3.21$, $p < .001$, $\eta p^2 = .10$. Figure 1 summarises these data.

Univariate tests showed a main effect of group for social vulnerability, $F(3, 158) = 3.40$, $p = .019$, $\eta p^2 = .06$, with follow up comparisons revealing that autistic offenders ($p = .042$) and autistic non-offenders ($p = .037$) were significantly more socially vulnerable than TD non-offenders (all other *ps* > .231). There was also a main effect of group for compliance, $F(3, 158) = 2.87$, $p=.038$, $\eta p^2=.05$. Follow up comparisons revealed that autistic non-offenders were significantly more compliant than TD non-offenders ($p = .048$; all other *ps* > .120).

The main effect of group for social motivation was significant, $F(3, 158) = 7.47$, $p < .001$, $\eta p^2 = .13$. Both autistic offenders ($p = .001$) and autistic non-offenders ($p = .001$) were significantly less socially motivated than TD non-offenders (all other *ps* > .055). There was also a significant main effect of restricted interests and repetitive behaviours, $F(3, 158) = 10.84$, $p < .001$, $\eta p^2 = .174$. Autistic offenders scored significantly higher on the restricted interests scale than both TD offenders ($p = .001$) and TD non-offenders ($p < .001$), but did not differ from the autistic non-offenders ($p > .99$). The autistic non-offenders also scored significantly higher on restricted interests than TD offenders ($p = .001$) and TD non-offenders ($p < .001$). There was no main effect of group for ToM, $F(3, 158) = 2.4$, $p = .069$, $\eta p^2 = .05$[3].



* $p < .05$; ** $p < .01$

[3] As IQ varied between two of the groups (TD offender & autistic non-offender), the above analysis was run with IQ as a co-variate, and the pattern of results was identical, except that the trend for ToM also became significant (F (3, 158) = 3.48, $p = .017$, $\eta p^2 = .06$). Follow up

Figure 1. Mean social vulnerability, compliance, social motivation, ToM and restricted and repetitive behaviour scores for each group with 95% confidence interval error bars.

Lone vs. co-offending

A chi-square analysis with the autistic offender and TD offender groups was conducted to establish whether lone vs. co-offending was associated with diagnostic status. Autistic offenders were significantly more likely to engage in lone offending than co-offending compared to TD offenders, χ^2 (1, N = 77) = 5.85, p = .02 (Figure 2).

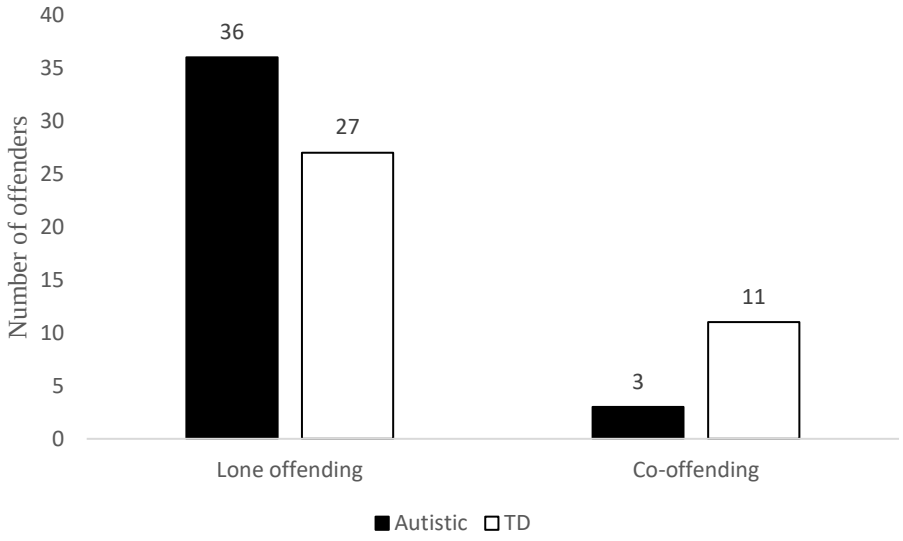


Figure 2. Number of co/lone offenders in autistic and TD offender samples.

There were not enough numbers in each cell to run binary logistic regressions for autistic and TD offender groups separately, thus the groups were combined. A binary logistic regression analysis was then run to identify whether social vulnerability, compliance, ToM, social motivation and restricted interests and repetitive behaviour predicted lone or co-offending. The model was not significant, $X^2(5) = 10.49$, p = .074 and explained

comparisons revealed that autistic non-offenders provided significantly fewer mental justifications compared to TD non-offenders (p = .021).

approximately 12.2% of the variance. None of the variables significantly predicted lone or co-offending (all *p*s > .060). Results are displayed in Table 3.

Table 3. Statistics for binary logistic regression assessing social vulnerability, compliance, ToM, social motivation and restricted interests and repetitive behaviours as predictors of lone and co-offending in the combined autistic and TD offender sample.

	B	SE	Wald	OR, Exp(B)	*p*
Social vulnerability	-.01	.05	.04	.99	.852
Compliance	-.09	.13	.49	.92	.483
ToM	.02	.11	.03	1.02	.870
Social motivation	-.14	.07	3.54	.87	.060
Restricted interests and repetitive behaviours	.01	.06	.01	1.01	.925

Discussion

To my knowledge this is the first study to quantitatively investigate whether autistic offenders typically engage in lone or co-offending and the role of social vulnerabilty, compliance, ToM, social motivation and restricted interests and repetitive behaviours in their offending. The results indicated that the vast majority of autistic offenders engaged in lone offending rather than co-offending. Contrary to earlier predictions, none of the factors measured within the current study significantly differed between autistic offenders and autistic non-offenders. Nonetheless, in line with initial hypotheses, both autistic samples (offender and non-offender) demonstrated increased social vulnerability and restricted interests and repetitive

behaviours in addition to diminished social motivation compared to TD non-offenders. No significant differences were identified between any groups on ToM and only the autistic non-offenders were significantly more compliant than TD non-offenders. Finally, none of the factors included within this study significantly predicted lone or co-offending.

The finding that autistic offenders were significantly more likely to engage in lone offending than co-offending, despite not differing from TD offenders on factors previously identified to influence lone and co-offending such as age and crime type (e.g., violent, sexual, drug crimes), suggests that lone offending may simply reflect the nature of offending in ASD as indicated in previous research (Helverschou et al., 2018). The low number of autistic co-offenders (n = 3) meant that it was not possible to run separate binary logistic regressions to identify whether social vulnerability, compliance, ToM, social motivation and restricted interests and repetitive behaviours predicted lone or co-offending in each autistic and TD offender groups, but none of the variables predicted lone/co-offending status when the autistic and TD offender groups were combined. Whilst this research study provides the largest sample to date of data on autistic offender's engagement in either lone or co-offending, it is important to acknowledge that this is the first study to investigate this. The small numbers of co-offenders within the autistic offender sample needs to be investigated further to investigate whether this is a characteristic of autistic offending or whether this was simply due to the sample included within this current research. Future research should try to expand upon this to increase the sample size to help further understanding of the prevalence of lone and co-offending in autistic offenders. Currently, it is not possible to generalise these findings to autistic offenders until more research with greater numbers of both lone and co-offenders has been conducted.

The increased social vulnerability in both autistic offender and non-offender groups suggests that social vulnerability may be associated with an ASD diagnosis. Previous research into social vulnerability in ASD has only included children (Sofronoff et al., 2011), and the

current research suggests that this vulnerability continues into adulthood. Individuals that score higher on the scale are suggested to be have greater impairments in abilities to detect or avoid potentially harmful interactions with others (Pinsker et al., 2006). Social vulnerability is an important factor to consider within the criminal justice system, given the potentially malicious intentions of TD criminals and the possibility of harmful interactions between TD and autistic offenders. Research suggests a variable experience of prison for autistic offenders (Allen et al., 2008; Helverschou et al., 2018) with some reporting greater difficulties than others (Newman et al., 2015; Patterson, 2008). Social difficulties and bullying were often reported to occur in prison (Newman et al., 2015; Patterson, 2008), with Paterson (2008) identifying that autistic offenders appeared unaware that they were being bullied. This further highlights the need, where possible, to place autistic individuals on a prison wing where they are at the least risk of victimisation.

Despite reporting increased social vulnerability, no significant differences were found in self-reported compliance by autistic offenders. This suggests that the current sample of autistic offenders were not more likely to yield to pressures applied by others, which may explain why the present study did not find heightened co-offending among this group. This would be in line with previous research suggesting that compliance is strongly associated with individuals being pressured into committing crimes to please others (Gudjonsson & Sigurdsson, 2004; 2007). Additionally, the lack of difference in compliance in the autistic offender sample may simply be reflective of the offender sample given that the scale does not explicitly measure prosocial behaviour and compliance has been found to be elevated in TD offender samples compared to non-offender (Gudjonsson, 1989). Alternatively, increased social vulnerability (i.e., difficulties detecting harmful interactions), may have resulted in the autistic offenders simply being unaware of the pressures being applied to them and thus they did not report them. The findings may also be explained by considering the assessment method

used. For example, Maras and Bowler used self-report and found no difference between autistic and TD adults, North et al. (2008) reported increased compliance as reported by informants and Chandler et al. (in press) found significantly increased compliance using a behavioural measure of compliance. This leads to an on-going question in autism research of whether autistic individuals are effectively able to represent themselves through self-report measures (e.g., Findon et al., 2016; Hesselmark, Eriksson, Westerlund & Bejerot, 2015; Hesselmark, Plenty & Bejerot, 2013; Mazefsky, Kao & Oswald, 2011; Shalom et al., 2006), and highlights the need for investigation of compliance using a combination of self-report and a behavioural measure (Chandler et al., in press) to confirm the present finding.

The lack of significant differences in ToM for autistic offenders supports research by Woodbury-Smith et al. (2005) that autistic offenders are not significantly impaired in ToM when compared to TD non-offenders. The most commonly used measures to assess ToM are the Reading the Mind in the Eyes (Baron-Cohen et al., 2001) and the Strange Stories (Happé, 1994). Both of these have been used in autistic offender ToM research. These measures require participants to view an image or read a scenario and make inferences based on these stimuli. Both measures of ToM are very static and may not reflect the interpersonal interactions experienced in everyday life. To progress understanding of ToM, future research on offending in ASD should investigate ToM using a more dynamic and psychometrically robust measure, such as the Adult Theory of Mind measure (Brewer, Young & Barnett, 2017). This measure uses video clips to assess ToM and restricts participants to one minute to respond to prevent individuals from hacking out the answers. This method is thought to provide a better understanding of the difficulties autistic individuals may have in the ToM domain (Brewer et al., 2017).

While autistic groups differed from TD groups on some of the measures, none significantly differed between the autistic offenders and autistic non-offenders, which suggests

that there are other reasons underpinning offending behaviour. Possible explanations of this are highlighted by Helverschou et al. (2015), who reported that idiosyncratic reasons, obsessions/special interests and rigidity were the most frequently reported reasons for offending in ASD. Rigidity would make co-offending seemingly impossible and the unusual and irrational reasons are unlikely to be shared by others, which may explain the increased risk of lone offending by autistic individuals. For example, Barry-Walsh (2004) reported on a case study of a young man who had an obsession with a radio station. After moving home, the station was difficult to tune in to, so the young man developed a complex combination of aerials to enable him to listen. This was successful until a new radio station started to interfere with his ability to listen to his desired station. Subsequently, after sending many letters to ask the radio station to stop interfering to no avail, he proceeded to burn down the radio station which he 'proudly' told his mother he had done the following day. To date, research suggests that interventions have variable impact on recidivism in ASD and that interventions need to be adapted for autistic individuals (Melvin et al., 2017). Both this study and previous studies (e.g., Helverschou et al., 2015; 2018) highlight the role of special interests and idiosyncrasies in offending, identifying the importance of future research to interview autistic offenders to help to understand the idiosyncratic reasons and how these may lead to offending. This could then be used to help inform, design or adapt offending prevention interventions.

In addition to limitations described earlier (e.g., static nature of ToM test) a number of other limitations need consideration with the first being the reliance on CJS staff to identify and confirm ASD diagnoses. Whilst this was the only option within this study due to ethical and establishment procedures, it could be possible that individuals may have been missed (e.g., if their diagnostic status was not known to the CJS). Furthermore, relying on self-report of diagnosis in the non-offending populations was also not ideal. Although the AQ-10 was used to ensure that TD individuals did not have high autistic traits (i.e., TD individuals who scored

over 6 were excluded from the study) the AQ-10 does not have perfect specificity and sensitivity values (Allison et al., 2012) suggesting that false positive (i.e., high ASD traits reported present when actually absent) and false negatives (i.e., low ASD traits reported when actually present) could exist within the sample. One possible solution would be to use a new 12 item scale developed by Lundqvist and Lindner (2017) which reduces the AQ50 to only 12 items with minimal loss of explanatory power. It is not ideal to rely on psychometric assessment (i.e., AQ-10), in future research should try to obtain access to medical records or alternatively conduct diagnostic assessments with participants to check ASD or TD status.

Another limitation is the self-report nature of the study because, whilst some research suggests that autistic individuals can accurately convey information using self-report measures (e.g., Hesselmark, Eriksson, Westerlund, & Bejerot, 2015), others report difficulties using this method (Findon et al., 2016; Hesselmark, Plenty, & Bejerot, 2013; Mazefsky, Kao, & Oswald, 2011; Shalom et al., 2006). Future research could combine both participant and significant other (e.g., parent, spouse) to compare reponses to examine if there are any significant differences in responses.

Furthermore, while the use of measures not validated for use by autistic individuals may also have influenced results, all measures were chosen due to the clear and literal presentation of questions to give autistic individuals the best chance to accurately express themselves. The final limitation is in relation to the lone/co-offending questionnaire. Although participants were not directly involved in the designing of the lone/co-offending questionnaire the questions were designed by researchers with a good knowledge and experience of working with autistic individuals. Throughout the data collection process, participants' ability to complete the questionnaire was monitored and no participants reported any difficulties. However, in future participants should be involved from the outset of designing the questionnaire. Research suggests that use of this approach typically leads to a better translation

into practise and subsequently better outcomes for autistic individuals (Fletcher-Watson et al., 2018). Despite these limitations, the questionnaire appeared to have good face validity. The limitations discussed here may limit the ability to generalise the findings from this study.

In conclusion, the present study suggests that autistic individuals were significantly more likely to engage in lone offending than co-offending but greater understanding is required to understand why this offending behaviour is more prevalent. Previous research has highlighted rigidity, idiosyncratic motivations and special interests as the most commonly reported reasons for offending in ASD (Helverschou et al., 2015; 2018), which may provide a better explanation for the lone offending observed here. Future research should investigate this further by exploring the self-reported reasons of autistic offenders to understand how these may influence offending preference (lone vs. co-offending). Further research should obtain samples of lone and co-offenders which have adequate power for separate (ASD; TD) binary logistic regression analyses to identify whether social vulnerability, compliance, ToM, social motivation and restricted interests and repetitive behaviours predict lone or co-offending and whether the role of these predictors differ between ASD and TD populations. Whilst the measures included in this study frequently differentiated between autistic offenders and TD non-offenders, none of the factors significantly differed between the autistic offenders and autistic non-offenders. Future research should ask autistic offenders to identify the reasons that they themselves believe led to their offending, to better understand the idiosyncracies suggested by case reports and clinical notes to underlie offending in autistic individuals. This will enable more tailored approaches to be developed and applied to help prevent offending and re-offending by autistic individuals.

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Post Academic Paper Two Commentary

Following on from limited group differences identified in Chapter Two, Chapter Three aimed to answer the following two research questions to advance understanding of autistic offenders: (1) Do autistic offenders typically offend alone or with others?; and (2) Do autistic offenders demonstrate a similar profile to autistic non-offenders (i.e., diminished Theory of Mind (ToM), and social motivation coupled with heightened social vulnerability, compliance and restricted interests and repetitive behaviours)?

The findings from Chapter Three indicate that autistic offenders were significantly more likely to engage in lone offending; however, similarly to Chapter Two, no significant differences were found between the autistic offenders and all three comparison groups (autistic non-offenders; TD offenders; TD non-offenders) on the variables measured (social vulnerability, compliance, ToM, social motivation and restricted interests and repetitive behaviours). One possible explanation is that they were unable to capture the suggested idiosyncratic reasoning associated with autistic offending (Helverschou et al., 2015; 2018). Thus, Chapter Four adopted the approach of asking the autistic sexual offenders themselves why they believed that they engaged in offending behaviours.

Chapter Four

Self-Reported Motivations for Offending by Autistic Sexual Offenders

Chapter Rationale

Following on from the previous thesis chapters which found limited factors (i.e., total Offending Factors Questionnaire score and behavioural conduct) which significantly differed between autistic offenders and non-offenders, this chapter sought to ask the offenders why they believed they engaged in the sexual offending behaviours. In addition, it was hoped that this study could help to unpack the frequently reported 'idiosyncratic' reasons for offending reported in previous research (Helverschou et al., 2015; 2018). Autistic sexual offenders were specifically focussed upon in this chapter for two main reasons: (1) previous research has found an increased prevalence of crimes against the person which included sexual offences (Cheely et al., 2012; Kumagami & Matsuura, 2009); (2) offender interventions are typically specific to the offending behaviours that are engaged in (Ministry of Justice, 2016) highlighting the importance of understanding the reasons for engaging in specific crimes. Furthermore, previous research has also identified that current offender interventions are highly variable in both their approach and impact with urgent calls to adapt treatments to meet the needs of autistic offenders (Melvin, Langdon, & Murphy, 2017). Thus, this chapter focussed specifically on autistic sexual offending (rather than a mixed offence sample) to provide a more specific and tailored explanation for the reasons for engaging in these behaviours which could then be used to inform interventions for this group.

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Abstract

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder estimated to have elevated prevalence in forensic populations (approximately 4.5%). It has been suggested that autistic offenders engage more frequently in crimes against the person and sexual offences than other types of offences such as property, driving, and drug offences. To date little is empirically known about the reasons why autistic individuals engage in sexual offences, yet understanding the motivation(s) for offending are key to developing and implementing effective interventions to help reduce both initial offending and also re-offending. In the current study, semi-structured interviews were conducted with nine autistic sexual offenders in prisons and probation services across England and Wales. Thematic analyses revealed five main themes (social difficulties; misunderstanding; sex and relationship deficits; inadequate control; disequilibrium). Analyses indicated that social skills difficulties, lack of perspective/weak central coherence, misunderstanding the seriousness of their behaviours and a lack of appropriate relationships were the main reasons for offending reported by this group of autistic sexual offenders. Findings highlight a need to develop sex and relationship education interventions which are tailored to the needs of autistic individuals, to address both their reported reasons for offending and their reported lack of sexual knowledge and awareness.

Keywords: autism spectrum disorder; sexual offending; offending; crime

Self-Reported Motivations for Offending by Autistic Sexual Offenders

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterised by persistent deficits in social communication and interaction coupled with restricted and repetitive patterns of behaviour, interests or activities (American Psychiatric Association, 2013). ASD is estimated to affect approximately 1% of the general population (Baird et al., 2006; Brugha et al., 2011), however, its prevalence is up to four and a half times greater in the prison population (Fazio, Pietz & Denney, 2012; Robinson et al., 2012) and up to three times greater in secure hospital and forensic psychiatric service populations (Scragg & Shah, 1994; Hare, Gould, Mills, & Wing, 1999; Siponmaa, Kristiansson, Jonson, Nydén, & Gillberg, 2001; Soderstrom, 2005) when compared to the general population.

It has been suggested that autistic[4] offenders may be more likely to engage in certain types of crime than others (King & Murphy, 2013); specifically that they are more likely to engage in crimes against the person (sexual offences, assault and robbery; Cheeley, Carpenter, Letourneau, Nicholas, Charles, & King, 2012; Kumagami & Matsuura, 2009) and less likely to engage in property crimes (burglary, arson and trespass), driving offences and drug offences (Cheeley et al., 2012; Kumagami & Matsuura, 2009). However, it is important to briefly note some of the methodological issues of this research. For example, approximately 50% of the sample in Kumagami and Matsuura (2009) met the criteria for pervasive developmental disorder not otherwise specified (PDD-NOS) rather than autism or Asperger's syndrome specifically. Additionally, the offence categorisation used by Cheeley et al. (2012) did not provide individual figures for sexual offending but rather included them within a category of 'crimes against the person'. Nevertheless, sexual offending was the most commonly committed

[4] We predominantly use identity first language to refer to individuals with a diagnosis of ASD. When asked to provide one term to describe themselves, 'autistic' was the preferred term by many autistic individuals within the UK, although we respectfully note that this view is not unanimous throughout the autism community (see Kenny et al., 2016).

crime reported by Kumagami and Matsuura (2009) and, while their sample was relatively small, it was representative as they reviewed all individuals (PDD and non-PDD) in four law courts in Japan. It is important to note that sexual offences (and crimes against the person) can be committed online, for example through distributing and downloading indecent images over the Internet (Criminal Justice Act, 1988; Protection of Child Act, 1978; Sexual Offences Act, 2003).

While research indicates that autistic offenders may be more likely to engage in offending of a sexual nature relative to other types of offences (Kumagami & Matsuura, 2009), it is unlikely that the minority of autistic individuals who commit crimes of a sexual nature do so due to differences in sexual interest or understanding of sexual vocabulary (Gilmour, Schalomon, & Smit, 2012). However, autistic adults do report less sexual and privacy knowledge (i.e., seeking privacy for sexual behaviours and awareness of rules) and demonstrate more public sexualised behaviour than typically developed (TD) individuals (Mehzabin & Stokes, 2011). They also report less access to peers as a learning source (Stokes et al., 2007), which may further place them at risk of offending in relation to inappropriate sexual behaviours (Hannah & Stagg, 2016). Research also indicates that while autistic individuals may reach comparative social and romantic functioning levels to TD individuals there may be a developmental lag (Stokes et al., 2007). Social and romantic functioning was measured using the Courting Behaviour Scale where social functioning measured areas such as socialisation and peer relationships whereas romantic functioning measured desire for, knowledge and experience of intimate relationships, sexual behaviour as well as sexual behaviours (Stokes et al., 2007).

The importance of theoretical understanding of sexual offending in assessment and treatment of sexual offenders has been well demonstrated in TD sexual offenders, however there are no theories of offending specific to autistic sexual offenders. There is also limited

discussion about the application of these to those with intellectual disabilities (ID; Keeling, Rose, & Beech, 2009). To date, the most comprehensive theory of sexual offending in TD offenders is the Integrated Theory of Sexual Offending - Revised (ITSO) (Ward & Beech, 2016). The theory suggests that sexual offending occurs as a result of interacting factors including: (1) biological (i.e., evolution, genetic variations, neurobiology); (2) ecological (i.e., social and cultural environment, personal circumstance, physical environment); (3) core neuropsychological systems and personal agency (i.e., motivational/emotional, action selection and control, perception and memory). These interactions are suggested to lead to clinical symptoms (e.g., emotional problems, social difficulties, cognitive distortions, deviant arousal) and subsequent sexual offending. Keeling et al. (2009) applied the ITSO to sexual offenders with ID using previous ID research and reported that all of the ITSO factors appeared to be relevant in ID sexual offending. Nevertheless, whilst some of the factors were speculated to have greater relevance (e.g., ecological niche, psychological functioning, biological factors), further research is necessary to identify whether certain factors are more or less pertinent in ID sexual offending (Keeling et al., 2009). To date, no application of the ITSO to ASD sexual offending is available.

The Ministry of Justice, who are responsible for improving public safety and reducing re-offending within England and Wales (Ministry of Justice, 2016), have a database of accredited Offender Behaviour Programmes offered to offenders to reduce re-offending. The programmes are often tailored to the offence committed (e.g., the Sex Offender Treatment Programme). However, it has been suggested that many of the clinical features of ASD, including cognitive inflexibility, empathy and social perspective taking difficulties, may interfere with effective assessment and treatment (Griffin-Shelley, 2010; Melvin, Langdon, & Murphy, 2017; Murphy, 2010a, 2010b). These findings, in combination with the suggested ineffectiveness of mainstream sex and relationship education in schools for autistic individuals

(Hannah & Stagg, 2016), highlight the need to understand the specific reasons for committing sexual offences by autistic individuals.

A number of reasons have been proposed within the available autistic offender literature as to why autistic individuals engage in sexual offending, but these are predominantly derived from case studies (e.g., Griffin-Shelley, 2010; Haskins & Silva, 2006; Ray, Marks & Bray-Garretson, 2004). Nevertheless, this existing literature indicates that the reasons for engaging in sexual offending by autistic individuals fall into four categories: 1) difficulties with social cognition; 2) lack of awareness and understanding regarding sexual issues; 3) compulsive thinking and sexual frustration; and 4) exploitation and abuse. Each of these are briefly considered in turn below.

Social Cognition

Diminished theory of mind (ToM) and associated social skill disparities are frequently cited as reasons for sexual offending in autistic offenders (e.g., Griffin-Shelley, 2010; Kohn, Fahum, Ratzoni, & Apter, 1998; Murrie, Warren, Kristiansson, & Dietz, 2002; Ray et al., 2004; Realmuto & Roble, 1999). Difficulties with social reciprocity (Haskins & Silva, 2006), reading emotional cues in others (Katz & Zemishlany, 2006; Ray et al., 2004), recognising the harm being caused to the victim (Griffin-Shelley, 2010; Katz & Zemishlany, 2006; Murrie et al., 2002), empathy (Griffin-Shelley, 2010; Murrie et al., 2002), having the interpersonal skills required to engage in consensual sexual contact with suitable partner (Chesterman & Rutter, 1993; Haskins & Silva, 2006; Murrie et al., 2002; Ray et al., 2004; Realmuto & Ruble, 1999), and social relatedness (Kohn et al., 1998) alongside interpersonal naiveté have all been implicated in sexual offending in autism (Griffin-Shelley, 2010; Murrie et al, 2002; Ray et al., 2004). Although ToM difficulties are widely reported in autistic individuals (e.g. Baron-Cohen, Leslie & Frith, 1985; Woodbury-Smith, Clare, Holland, Kearns, Staufenberg, & Watson, 2005), it has been proposed that often autistic sexual offenders understand the concept of

reading others' minds but are unable to apply the theory to everyday situations (Chesterman & Rutter, 1993; Kohn et al., 1999). This vast but largely speculative array of suggested explanations for sexual offending in ASD that are underpinned by differences in social cognition highlight the need for a more detailed and nuanced understanding of how these may translate into sexual offending.

Awareness and understanding regarding sexual issues

Reduced sexual awareness (Barry-Walsh & Mullen, 2004; Murrie et al., 2002), particularly in terms of socially acceptable and legal sexual behaviours (Barry-Walsh & Mullen, 2004; Haskins & Silva, 2006) have been proposed to relate to sexual offending behaviour in ASD. Indeed, some sexually deviant behaviours are proposed to result from lack of awareness rather than deviant preferences (Murrie et al., 2002). It is important to note, however, that this finding is based upon only three case studies. Given that autistic adults who have not offended demonstrate similar privacy knowledge and public sexualised behaviour to TD adults (Gilmour, Schalomon, & Smit, 2012; Mehzabin & Stokes, 2011; Stokes & Kaur, 2005), further exploration of autistic offenders' sexual awareness in relation to their offending is warranted as it has important implications for education and interventions.

Compulsive thinking and sexual frustration

Obsessive behaviours with sexual connotations (Chesterman & Rutter, 1993), sexual preoccupation (Murrie et al., 2002; Ray et al., 2004), and sexual frustration and the associated impulsiveness to relieve tensions and frustrations (Milton, 2002; Ray et al., 2004) have also been suggested to underlie sexual offending in ASD. For example, one case study reported on a 28-year-old male exhibiting compulsive masturbation (5 times daily), who had a collection of 'artificial vaginas' who moved out of the familial home in order to be able pursue his preoccupation with having sexual intercourse (Murrie et al., 2002).

Exploitation and abuse

Exploitation has also been suggested to play a role in sexual offending in ASD, for example with others convincing an autistic individual to expose themselves in public as a joke (Sevlever et al., 2013). Additionally, being a victim of sexual abuse can contribute to inappropriate sexual behaviours, whereby an individual replicates the behaviours to which they were victim (Ray et al., 2004). Research within autistic populations suggests that an individual is at increased risk of carrying out sexually abusive behaviours if they have a history of physical (10.8 times more likely) and sexual (8.6 times more likely) abuse themselves (Mandell, Walrath, Manteuffel, Sgro, & Pinto-Martin, 2005). These figures are substantially higher than TD data which indicate that sexual offenders are 3.6 times more likely to be sexually abused and 1.6 times more likely to be physically abused than non-sexual offenders (Jespersen, Lalumière, & Seto, 2009). Previous research indicates a large increased risk of sexual victimization for autistic individuals (e.g., Brown-Lavoie et al., 2014; Gotby, Lichtenstein, Langstrom & Pettersson, 2018; Roberts et al., 2015, White & Buehler, 2012). However more recently in a study of 4,500 participants, although ASD was found to be associated with a three times greater risk of childhood sexual victimization, once symptoms associated more generally with neurodevelopmental disorders were controlled for there was no significant effect of the ASD diagnosis (Gotby et al., 2018).

Whilst the literature suggests several potential reasons for sexual offending in ASD, as noted earlier this information is gathered from very small samples (i.e., mainly single case studies) with the maximum number of cases included in a study being three or it is not specifically related to sexual offending (i.e., combines offences). To our knowledge, there is no published data that has been obtained directly from autistic sexual offenders as to their understanding of why they engaged in sexual offences. The effectiveness of current interventions to reduce recidivism in ASD are reported to be highly variable in both treatment

approach and impact (Melvin et al., 2017); thus, there is an urgent need to adapt treatments to meet the needs of autistic offenders (Melvin et al., 2017).

In summary, there is very limited knowledge (derived from a scattering of case studies) upon the motivations for sexual offending in ASD. Both the autistic offender literature and the TD offender literature highlight the importance of interventions which target specific needs, behaviours and motivations. The aim of the current research was to provide an in depth understanding of the motivations for sexual offending as described by the autistic offenders themselves, as a crucial step to informing interventions and reducing recidivism.

Method

Sample

Nine male autistic offenders were interviewed in this study. They were recruited from four prisons and two probation services across England and Wales. Initially establishments were selected and contacted based on whether it was possible for the researcher to travel to the location and those included reflect those who advised that they had autistic offenders who were willing to participate as well as the resources to facilitate the interviews. Participants were identified by Criminal Justice System staff as being diagnosed with ASD according to their records kept by the prison or probation service. All participants had a diagnosis of autism spectrum disorder. An all-male sample was selected because approximately 95% of the prison population is male (Ministry of Justice, 2016).

The inclusion criteria were that participants were aged 16 years or older and were deemed to have the capacity to consent (as initially indicated by staff and then determined at the point of informed consent), while exclusion criteria were those without a good understanding of the English language, active psychosis or psychotic illness, head injury and/or untreated epilepsy.

The mean participant age in years at time of interview was 29.56 (SD = 8.68). Their mean age at receiving an ASD diagnosis was 13.13 years (SD = 4.90). The highest and most commonly achieved educational attainment of the sample was an undergraduate degree (n = 3) with only one participant reporting no formal educational attainments. The majority of participants were in prison at the time of testing (n = 6), two participants were in rented accommodation, and one lived in the parental home. All participants were single.

The offences committed by participants were not mutually exclusive and included downloading and possession of indecent images (n = 4), sexual assault (n = 3), indecent assault (n = 2), taking and distributing indecent images (n = 1), causing or inciting a child to engage in sexual activity (n = 1) and arranging and facilitating a child sex offence (n = 1).

Procedure

Participants engaged in a semi-structured interview lasting between 10 and 50 minutes. The interviews were conducted in the prison or probation service in which the individual was being managed. Interviews were recorded on an encrypted and password protected voice recorder with the participant's written consent. Data collection ended once data saturation was reached; that is, when the data being collected no longer generated new themes (Braun & Clarke, 2013). For this research after participant five no new themes emerged and data collection ended after participant nine, when it was felt that no new themes would emerge.

Measures:

Participants engaged in a semi-structured interview mainly consisting of open questions allowing for exploration of points individuals made. Questions revolved around the overarching question of why the offenders believed they offended but also included more specific questions about the role of others and substances, for example. The interview had face validity as it easily obtained information about the motivations for offending in the autistic

offenders interviewed. The questions were developed with the target audience in mind (i.e., questions were clear, succinct, unambiguous) by researchers with vast experience of autism. The initial questions were more open (i.e., can you tell me, in your own words, why you think that you committed the crime?). However, if individuals struggled with this, then later questions were progressively narrower (e.g., what was the main reason that you committed the crime?). The semi-structured interview can be found in Appendix 4.

Data Analysis Plan

Once transcribed, interviews were analysed using thematic analysis by the first author, whereby the aim was to provide a rich thematic description of the entire data set (Braun & Clarke, 2006). Coding was conducted in an inductive fashion where the researcher did not try to code the data according to a previously determined coding framework or analytic preconceptions but rather the coding was data driven (Braun & Clarke, 2006). A second coder (KM) coded 20% of the data independently. Inter-rater reliability was determined through a thorough discussion of the independent codes generated. The themes identified by each coder were discussed and agreement within the coding was reached. Whilst the names given to some of the themes identified differed between coders (e.g., caught up in the moment vs. getting carried away) it was clear it was clear during the discussion that the underlying understanding of the themes identified were the same. All of the theme names were discussed and agreed upon.

Following Braun & Clarke (2006), the themes were first identified at a sematic level. That is, the codes were interpreted at an explicit level and the researcher did not try to look for anything beyond what the participant had said; before interpreting them to understand the wider meaning. Ideally a theme would occur multiple times, however the number of occurrences did not mean the theme was more or less important to the results (Braun & Clarke, 2006). As discussed earlier, offender interventions are specific, and this research aimed to positively

influence as many individuals as possible. Thus, from a practical and applied point of view (to enable a greater impact of offending prevention and recidivism interventions), the number of offenders who mentioned a theme were included to enable time and resources to be targeted at the risk factors most commonly reported.

Ethics

Two weeks prior to participation, individuals received an information sheet explaining the study. Written consent was obtained prior to participation and at the start of each interview verbal consent was recorded to confirm consent to record the interview. Information and consent forms can be found in Appendix 5. Ethical approval was obtained from the University of Bath Department of Psychology Ethics Committee (ref no. 15-026), the National Offender Management Service (ref no. 2015-131) and the NHS Research Ethics Committee (ref no. 15/WA/0214).

Results

Five main themes emerged from the data with regards to autistic participants' reported motivations for engaging in sexual offending. These were: (1) social difficulties; (2) misunderstanding; (3) sex and relationship deficits; (4) inadequate control; and (5) disequilibrium. Typically, participants referred to multiple themes and sub-themes. Figure 1 details the themes and associated subthemes. Each theme (in bold) and its subthemes (in bold italics) are described in detail in the text below.

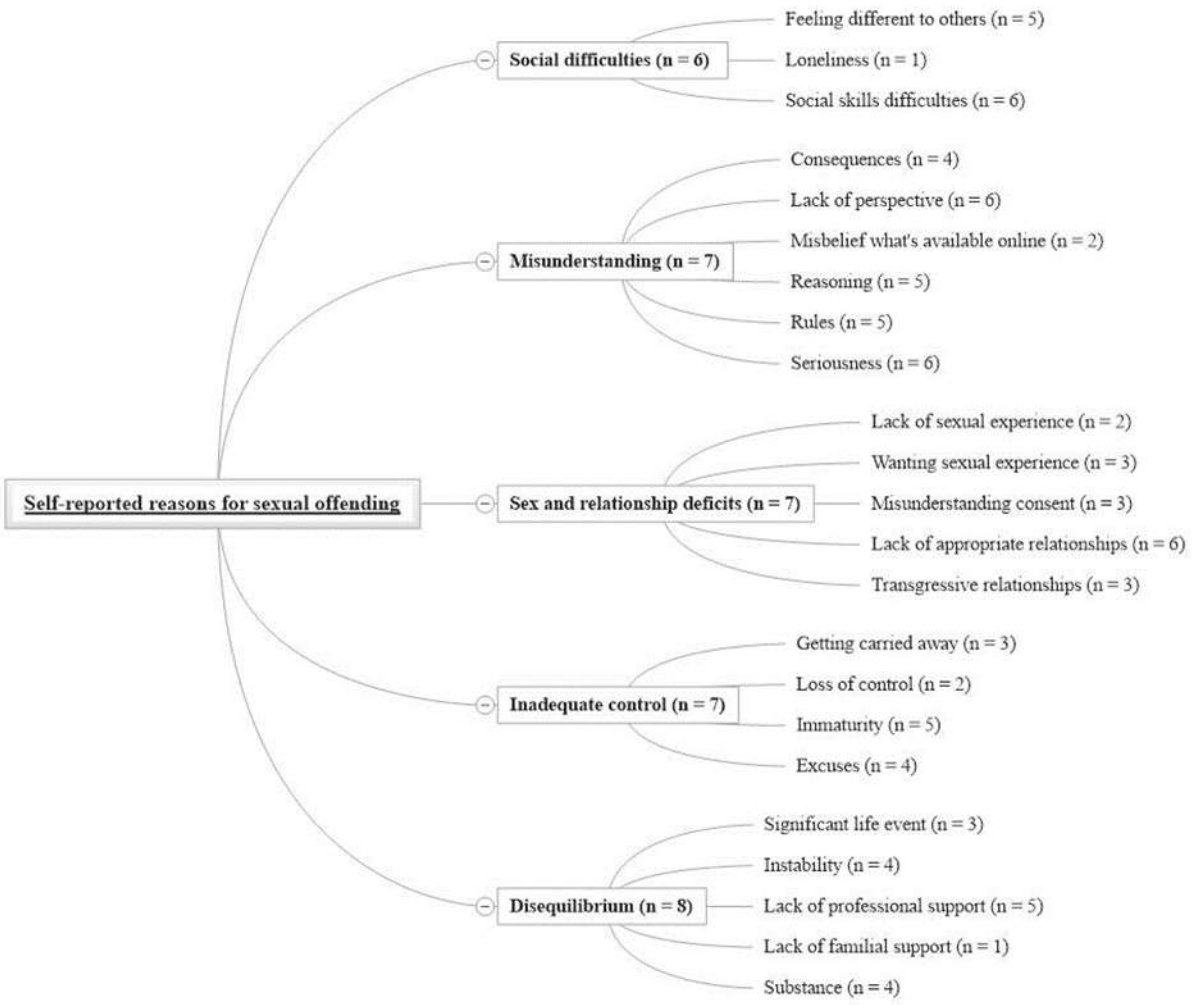

Figure 1. Reported reasons for offending provided by autistic sexual offenders

Theme One: Social difficulties

Most participants (n = 6) referred to social difficulties as a factor in their offending. This included difficulties interacting with and understanding other people and the feelings associated with the outcomes of these difficulties (e.g., feeling different to others, loneliness). The majority of interviewees (n = 6) mentioned ***social skills difficulties,*** referring to difficulties interacting socially, understanding social boundaries and how to approach others appropriately:

"at the time I was errrm not very good socially … with people."

[Participant 1]

"Primarily coz I had trouble socialising with other people and I suppose not having a normal relationship outside [of the internet] *I was able to retreat to myself and keep to myself."*

[Participant 4]

Only one participant spoke of ***loneliness***, linking it directly to the offending:

"I was quite lonely at the time and it was just kind of I did what I did [online offence] *to kind of… maybe try and be closer to other people and I just went about it the wrong way."*

[Participant 2]

Other participants (n = 5) reported ***feeling different to others***, and that this influenced their lives in relation to both the development of intimate relationships:

"…but I didn't want her to get to know me because…. I knew I was different from other people… I wasn't on the same planet as everybody else. I was in the world of ritual."

[Participant 1]

and friendships:

"if you tried to make good friends they would think that you were weird because you know what I mean … you're not normal or they would try and push you out into a different group."

[Participant 5]

Participants also made links between feeling different to others and elements of ToM such as being able to predict others' behaviours:

"To be honest I didn't know how people would react normally."

[Participant 8]

Theme Two: Misunderstanding

The majority of participants (n = 7) mentioned at least one area of misunderstanding when asked about why they believed that they engaged in the offending behaviours. The different areas of misunderstanding included: ***being unaware of the consequences; the***

seriousness of the behaviour; a lack of perspective/weak central coherence; misbelief of what is available online; and misunderstanding the rules and reasoning differences.

A lack of understanding of the ***consequences*** was mentioned by a number of participants (n = 4). This included both the consequences to themselves:

"I didn't know….and this is going to sound odd….I didn't know how wrong it was. I didn't know what the consequences were going to be."

[Participant 7]

and also the consequences of their behaviour on others:

"…like not really, not really knowing the errr the consequences of my actions like not just obviously what's going to happen to me but like what's going to happen to other people and everything like that."

[Participant 2]

The majority of participants (n = 6) also reported (often on numerous occasions) being unaware of the ***seriousness*** of their behaviour at the time of offending:

"erm…like I knew it was illegal erm, but I didn't realise like how severe it was, if that makes sense. Coz it kind of seemed like the sort of thing that everyone was doing so erm, yeah it was like… I knew…I knew it was bad but I didn't realise kind of like… how bad."

[Participant 2]

"Erm, I don't think I realised how serious it was. I just thought, it's fine, I did it and then deleted it [indecent images] *within 24 hours…. ermmm… and then just thought that was it gone…. that's it done, out the way. Shouldn't have done that. Erm…. And then just got on with the few days and then the police turned up."*

[Participant 9]

Relatedly, more than half of the sample (n = 5) reported ***misunderstanding the rules***. For example, they often reported not realising that the behaviours that they engaged in may be against the rules or were breaking the law:

"It [the fact the behaviour was illegal] *never filtered into my head until I did this* [offence related] *course."*

[Participant 5]

Two interviewees referred to ***misbelief about what is available online,*** with two types of misbelief arising. The first being that prior to their offence individuals felt safe to open or download items because they believed that internet search engines would not put anything illegal on their sites:

"Google being a something that is a company that only has information given to them to advertise and stuff like that. Surely they wouldn't put anything illegal on?"

[Participant 3]

The second misbelief related to the nature of the contents and ease of availability of illegal images and videos.

"I was downloading Disney DVD's to watch on the Xbox which we had been doing and I'm sure my ex said that in interview…One of them [files] *had some child porn…. ermm…it was really shocking that that is available. Obviously it had a code on the top like, some horrible code so I just searched it on the programmes that we were using to download movies – just to see what came up…I downloaded a few and looked through a few but I was just like I can't believe that's available online."*

[Participant 9]

Reasoning that appeared unconventional and lacking in personal accountability was demonstrated by a number of offenders (n = 5). Some individuals believed that the behaviours

for which they were convicted of were an extension of more minor illegal behaviours (e.g., illegally downloading films):

"I knew what I was doing [downloading films/DVD's] *was illegal anyway so it was kinda like I've been a bit more illegal now…just deleted* [child pornography] *and thought that was… I won't do that again."*

[Participant 9]

Some individuals placed unreasonable responsibility on the victim:

"I was at college… on the way home…I was on the bus…chatting to her… and all I did was put my hand on her thigh…she didn't tell me to get off...she just carried on…and tried to do me for a crime."

[Participant 3]

Others showed unusual reasoning regarding the knowledge of the police about the illegal material:

"I'm surprised that the police haven't you know, they've managed to hunt bin laden down in the middle of nowhere what, how have they not blocked all child abuse photos and images that you can download. I don't understand. And if they are arresting you for it then they know it's there so…"

[Participant 9]

The majority of participants (n = 6) also reported a ***lack of perspective/weak central coherence***, with individuals reporting being caught up in the moment and being unaware of either how the situation might unfold or how the other person(s) may feel or interpret the situation:

"I kind of think about me in the erm… in sort of like here and now but I don't really think about the bigger picture if that makes sense."

[Participant 2]

"I think I probably got too much wanting to know why something got done and not realising the mistake of going too far forwards in like trying to understand something. But I should have took two steps back to take a look at everything backwards. Then I should have known, then I could have done, probably realised I should have gone to the police and stuff like that."

[Participant 3]

Theme Three: Sex and relationships

Most of the participants (n = 7) discussed issues surrounding sex and relationships in the context of their offending. Two participants (both contact offenders) talked about how a ***lack of sexual experience*** drove their offending (n = 2). ***Wanting sexual experience*** was also mentioned by some of the contact offenders (n = 3), who were looking for the experience of sex rather than the relationship experience that often accompanies such experience:

"To me at the time it was a case of... looking back ..... a sexual object....now.....if I'm quite honest with you....errm.... I just wanted sex...."

[Participant 1]

"I wanted to lose my virginity and I wanted to have sex. Everyone was going on about it and said how fantastic it is."

[Participant 8]

Some participants (n = 3) also reported ***misunderstanding consent***, whereby they believed that they were obtaining consent from the victim, but their understanding of consent was incorrect:

"because I always asked if I could and if they [child victims] *said no I didn't and so in my head that was consent."*

[Participant 7]

"I thought everything I was doing was correct but when I look back, even know, I'm thinking that maybe I should have asked or maybe I could have done something different or maybe I shouldn't have done it that way or maybe I shouldn't have done it at all."

[Participant 8]

Lack of appropriate relationships were also reported by most participants (n = 6). On occasion participants indicated that this led to seeking relationships in less than conventional ways (e.g., forums, chat rooms) and in some cases this directly led to the platform on which the offending took place:

"I think just the fact that I can't like or well, or I couldn't or I struggled to erm…like socialise with people and stuff. Erm… so … you know…it's like, I've never really had any friends."

[Participant 2]

"Primarily coz I had trouble socialising with other people and I suppose not having a normal relationship outside [of the internet] *I was able to retreat to myself and keep to myself."*

[Participant 4]

Some participants (n = 3) indicated having ***transgressive relationships***, and this often related to a lack of appropriate relationships in their lives. Transgressive relationships refer to relationships that do not conform to normal conventions (e.g., inappropriate relationships with children, offenders being victims of abuse):

"yeah well obviously I spoke to quite a few people and a few of them weren't you know…erm … of the legal age."

[Participant 2]

"I don't know how not to call it a relationship because it was…it was an abusive relationship… in the same way that the relationship that I had with ****** [offender's abuser] *was abusive but it was still a relationship."*

[Participant 7]

Theme Four: Inadequate control

This theme arose in most of the interviews conducted (n = 7). Several participants (n = 3) reported ***getting carried away,*** whereby their intention was not to offend or cause harm to the victim but rather they focussed too intently on their own intentions without considering the other person:

"I never really kind of like went out with the intention for it to turn like sexual but you know…we kind of got chatting and it kind of just happened."

[Participant 2]

Individuals also identified the link between getting carried away and a lack of sexual experience.

"I felt emotions for this person…well not emotions…but I felt attraction and I took it for the first time…"

[Participant 5]

Two participants (both contact and non-contact) reported a **loss of control**, with an inability to control themselves in the moment. Of note is that majority of the participants who were interviewed reported that they did not plan their offences:

"I want to speak to people. I wanna – you know…and then it just kind of got out of control really."

[Participant 2]

"I wanted sex all the time... It overcame me."

[Participant 8]

Immaturity emerged as a sub-theme in over half of the interviews (n = 5). Two variations of this emerged – one where the childish or juvenile behaviour of the individual led to an offence:

"It was just literally play fighting that led into the like sexual assault."

[Participant 5]

"A joke was taken out of hand."

[Participant 3]

The second where individuals reported emotional under development and a desire not to grow up:

"I was 15 well….chronologically 15 but emotionally at least 2 years behind …if not more….erm….and I didn't really want to grow up. The adult world was quite a scary place and I wasn't really….I was quite happy not growing up."

[Participant 7]

Several participants (n = 4) presented control-related issues as ***excuses***; however, many also demonstrated a lack of social understanding and misunderstanding of consent:

"but erm I… if she hadn't gone so far and then decided to stop."

[Participant 1]

"all I did was put my hand on her thigh…she didn't tell me to get off…she just carried on."

[Participant 5]

Theme Five: Disequilibrium

Almost all interviewees (n = 8) referred to an element of disequilibrium whereby significant life changes, lack of support or altered mental state due to substances appeared to impact upon their offending behaviour. ***Significant life events*** were mentioned by a third of participants (n = 3). A range of significant life changes (e.g., finishing education, changes in domicile, historical childhood abuse) were mentioned:

"both convictions were where I had left home for the first time, and my head was all over the place…I went to try and find my birth family because I got adopted at a young age."

[Participant 5]

"I mean I can't really say all of this is because of what happened to me growing up … err…. because you know that's not taking responsibility and I do take full responsibility but the line that I took from what ****** [offender's abuser] *did to me influenced my thoughts and feelings and everything else about relationships."*

[Participant 7]

Instability or period(s) of uncertainty were referred to by many of the participants (n = 4) prior to offending. These periods were resultant from a number of factors (e.g., dismissal from employment, lack of money, lack of safety):

"I had no money. I tried robbing the victim."

[Participant 6]

"it's quite difficult to kind of explain how much the feeling of safety….it you've never been in a position where for 2 years you've never felt safe [due to being victim of sexual abuse] *and then suddenly being here in a position/situation where you are entirely safe* [with first victim] *it's very difficult for anyone to really understand."*

[Participant 7]

More than half of the sample (n = 5) also reported a ***lack of professional support***. Participants often felt that having an ASD diagnosis was irrelevant as they did not receive the support that they felt that they needed to enable them to function effectively within the rules/norms of society:

"it [ASD] *was kind of something that was just on a bit of paper rather than something that I actually got help with."*

[Participant 2]

"We got no help through school…no help through any people. We applied for it…put loads of applications in but nobody came and helped out. Erm…I think we had … we were causing arguments at home so we had like counselling for family but that still isn't based on autism.

It was more …. We applied for help but nothing came of it. Erm and then as soon as I turned 18 that was kind of it…everybody went - you're too old…we're wiping our hands of you."

[Participant 5]

Only one interviewee reported a ***lack of familial support***, but it appeared to have a significant impact on his offending behaviours:

"Erm…. Yeah mum knew that there were major issues between me and him [offender's abuser] *but she didn't know what they were … and she never actually bothered to ask…."*

[Participant 7]

The use of ***substances*** was mentioned by four interviewees, but its role in the offending was conflicting between participants. Some participants felt the substance influenced the offending:

"had I not been drinking I don't think I would have committed the offence."

[Participant 1]

whereas other participants felt that the substance hadn't influenced the offending:

"I had cannabis in my system but I was still body functioning…I was still aware."

[Participant 5]

Themes one and two appear to be more autism specific whereas themes three, four and five appear to be more general factors. Autistic offenders typically reported a combination of factors being involved in their offending (i.e., ASD-specific and general factors). Table 1 provides an overview of the themes and subthemes that each participant referred to.

Table 1. Overview of themes and participants who referred to them during interviews

Theme	Sub theme	P1	P2	P3	P4	P5	P6	P7	P8	P9	Sub theme	Theme
Social difficulties	Feeling different to others	x	x			x		x	x		5	6
	Loneliness		x								1	
	Social skills difficulties	x	x		x	x		x	x		6	
Misunderstanding	Consequences		x					x	x	x	4	7
	Lack of perspective/WCC	x	x	x		x		x	x		6	
	Misbelief what's available online			x						x	2	
	Reasoning	x		x		x		x		x	5	
	Rules		x	x		x		x		x	5	
	Seriousness		x	x		x		x	x	x	6	
Sex and relationships	Lack of sexual experience	x							x		2	7
	Wanting sexual experience	x				x			x		3	
	Misunderstanding consent					x		x	x		3	
	Lack of appropriate relationships		x		x	x		x	x	x	6	
	Transgressive relationships		x		x			x			3	
Inadequate control	Gets carried away					x			x	x	3	7
	Loss of control		x						x		2	
	Immaturity	x		x		x		x	x		5	
	Excuses	x				x		x		x	4	
Disequilibrium	Significant life event			x		x		x			3	8
	Instability			x	x		x	x			4	
	Lack of professional support		x		x	x		x		x	5	
	Lack of familial support							x			1	
	Substance	x		x		x	x				4	

Discussion

The aim of this research was to provide an in depth understanding of the motivations for sexual offending as described by the autistic offenders themselves. Five main themes emerged: social difficulties; misunderstanding; sex and relationships; inadequate control; and disequilibrium. Autistic offenders typically reported multifaceted reasons for offending, highlighting the need to consider a range of factors within autistic offender assessment and interventions. The first two themes (social difficulties and misunderstanding) appear to reflect broader autism specific difficulties whilst the other three themes (sex and relationships, inadequate control, disequilibrium) may be more specific to autistic sexual offenders. Findings emerged not out of a predetermined coding framework or analytical preconceptions but rather the coding was data driven thus providing a true reflection of what the offenders said. The clinical features of ASD (e.g., cognitive inflexibility, difficulties with perspective taking) may lead to difficulties conducting effective assessment (Griffin-Shelley, 2010; Melvin, Langdon, & Murphy, 2017; Murphy, 2010a, 2010b). This, coupled with the reported variability in the effectiveness of recidivism interventions for autistic offenders highlights the need to adapt interventions (Melvin et al., 2017). For example, the self–reported perceived lack of professional support (disequilibrium theme) may be pertinent when considering autistic re-offending.

Prior to engaging in sexual offences, offenders frequently experienced a chaotic period (e.g., significant life events, substance use) characterised most often by a persistent lack of professional support specific to their ASD diagnosis. The significant life events referred to by the current sample of autistic sexual offenders included: dismissal from work; moving house; finishing college; moving out from the parental home; finding their birth family (where adopted); parental illness; and breakdown of a romantic relationship. Such events are likely to be particularly disruptive for autistic individuals, given that insistence on sameness is

characteristic of ASD and is positively associated with anxiety (Uljarevic, Richdale, Evans, Cai, & Leekham, 2017). Stress and anxiety have been identified as core factors within TD sexual offending models such as the Integrated Theory of Sexual Offending (Ward & Beech, 2006), however autistic adults are more vulnerable to significant change in life situation and hence may be more likely to experience increased stress than other groups (Gilliott & Standen, 2007). The final factor included within the disequilibrium theme was substance use. Substance abuse, especially alcohol abuse has frequently been linked to sexual offending within the TD sexual offender literature with regards to both the aetiology and maintenance of offending behaviours (Abracen, Looman, & Ferguson, 2017). Theories of offending suggest several functions of substances in offending including helping to overcome inhibitions (Finkelhor, 1984) or increasing impulsivity (Ward & Beech, 2006), which may be causal factors in sexual offending for both autistic and TD individuals.

Autistic offenders reported social skills difficulties that largely revolved around difficulties and uncertainties with handling social situations. These included not knowing how to communicate with others, uncertainty over how to interact face-to-face, uncertainty of social boundaries, and how to approach others to initiate friendships or romantic relationships. This and the finding that many autistic offenders were unable to effectively read the social situations and interpersonal interactions that led to the offence(s), may be reflective of ToM deficits. Previous research has reported ToM deficits in TD sexual offenders (e.g., Castellino, Bosco, Marshall, Marshall, & Veglia, 2011), and while ToM difficulties are widely reported in ASD (e.g., Baron-Cohen et al., 1985), research examining ToM in autistic offender samples has reported inconsistent findings (Chesterman & Rutter, 1993; Kohn et al., 1999; Woodbury-Smith et al., 2005). While findings from the present study indicate that social cognition difficulties are prevalent in autistic sexual offending, it is not possible to disentangle whether

difficulties reading social situations are directly related to the offending behaviour or to the ASD diagnosis more broadly.

The current research suggests that many of the offences may have occurred from an inability to effectively read and interpret the victims' intentions and behaviour (e.g., not wanting to engage in certain acts). Thus, while autistic offenders (mixed offences) may perform similarly to TD participants on ToM tasks (Woodbury-Smith et al., 2005), when placed in a real life and dynamic situation where the demands are greater (i.e., less time, more cues to interpret) this may not be the case. Previous research specific to autistic sexual offenders suggests they have the theory of ToM but are unable to apply it to real life situations (Chesterman & Rutter, 1993; Kohn et al., 1999). Whilst this research did not formally assess ToM, many responses were indicative of ToM difficulties, which future research can investigate further. Given the static and lab-based nature of currently used ToM assessments which autistic offenders may pass, further research may benefit by implementing a more interactive and dynamic assessment of ToM which reflects everyday life, such as that described by Brewer, Young and Barnett (2017). Their 'Adult ToM' (A-ToM) measure requires participants to watch videos based in part on the scenarios presented in Happe's Strange Stories assessment (Happé, 1994) and to answer the associated question within one minute. The one-minute response time is to limit the potential for individuals to 'hack' out the answer (Brewer et al., 2017). Autistic individuals lack implicit theory of mind but are thought to be able to acquire explicit theory of mind through teaching of typically considered implicit rules (Frith, 2004). Careful consideration of the learnt rules is the reason why some autistic adults perform comparatively well on the static measures of ToM (Frith, 2004), but examining performance on the more dynamic A-ToM measure may be fruitful in guiding more tailored interventions to the specific needs of autistic individuals.

Social skills difficulties appeared to be strongly linked to a lack of appropriate relationships, with 83% of individuals who mentioned social skills difficulties also reporting a lack of appropriate relationships. Interviewees reported wanting to speak to others, a lack of friends and a lack of opportunity for interactions with the opposite sex. Friendships and relationships are considered vital for social functioning (Stoke, Newton & Kaur, 2007) and social functioning is in turn important to romantic relationship development (Stokes et al., 2007). Research suggests a link between social skills training and increased numbers of appropriate romantic relationship approaches made which may have led to a reduction in romantic loneliness (Gantman, Kapp, Orenski & Laugeson, 2013). This suggests that providing autistic individuals with education and opportunities (e.g., supervised social groups) to improve their social skills might help to improve social functioning development, which in turn may enable healthy romantic relationship development.

It is unknown whether the autistic participants within the current research had received any sex and relationship education prior to offending; however, the literature suggests that current mainstream sex and relationship education packages are not appropriate for autistic individuals (Hannah & Stagg, 2016). All participants in the study by Hannah and Stagg (2016) reported a negative experience of their sex education and it is suggested that specific methods and curricular are required. For example, educational programmes should cater to thought rigidity and be tailored to the difficulties in reading the intentions of others (Hannah & Stagg, 2016). The current findings support previous research suggesting that a lack of sexual awareness may lead to 'accidental offending', and this should also be included in intervention packages (Hannah & Stagg, 2016; Murrie et al., 2002).

Another key finding was that, at the time of offending, individuals were unaware of a number of factors such as the seriousness of behaviour, and the rules and laws surrounding it. However, when this was explained, or the individual experienced the consequences of their

actions, the offenders demonstrated improved understanding. Many commented that now that they understood the impact of their behaviours on others and that their behaviours were illegal, they had a desire to desist from offending in the future. As noted earlier, autistic individuals do not differ from TD individuals in terms of their sexual interest (Gilmour et al., 2012; Stokes & Kaur, 2005) but their actual sexual knowledge is reportedly diminished (Mehzabin & Stokes, 2011). Education to improve the sexual knowledge of autistic individuals in combination with the seriousness and laws governing such behaviours may be particularly beneficial for this group. This should be provided in an ASD-accessible format to help prevent initial offending or re-offending. It is important to consider whether the reasoning that indicated a misunderstanding about the responsibility of search engines such as Google reflects a retrospective view or whether this logic was at play at the time of offending. If the latter is correct then this highlights the need for clear and more specific rules and education about the use of the internet.

As noted by Hannah and Stagg (2016), education interventions need to be tailored to the needs of autistic individuals, and they need to be age-appropriate. One such intervention is PEERS®, a social skills training intervention designed by Laugerson and Frankel in 2005 which has three different manuals (i.e., one for pre-schoolers, adolescents and young adults; Semel Institute, 2018). The adolescent and young adult manual covers a variety of social skills topics, some of which are age-specific. For example, the young adult (but not the adolescent) manual covers, "how to develop romantic relationships and use appropriate dating etiquette". Since several individuals in the current research and previous research (e.g., Griffin-Shelley, 2010; Ray et al., 2004) initially began sexually offending before becoming a young adult, it may be beneficial to include information about this at an earlier age in interventions for those at risk. Additionally, it may be helpful to include relevant information about the law to help enable individuals to make informed choices.

The majority of participants reported that they did not plan their offending but spoke of a need for greater processing time in order to make informed decisions. Again, education may be key; autistic individuals can be advised to take time to think before acting and provided with information about the law and seriousness of certain behaviours and encouraged to make an informed decision before engaging in these behaviours.

The lack of professional support prior to offending that was reported by the offenders within this study was striking. One possible explanation is the older mean age at which the autistic offenders (Mean = 13.13) were diagnosed compared to non-offenders which is reported to be between 3.17 to 10.0 years (Daniel & Mandell, 2014). Nonetheless future research should explore with autistic offenders the types of support they feel that they would benefit from. Fabri, Andrews, and Pukki (2016) demonstrate the effectiveness of collaboration between autistic adults, researchers and stakeholders (e.g., parents, teachers, higher education academics and support staff) using the design thinking process to design a tool kit for preparing school students to navigate university. Future research should evaluate support that is currently available and identify and address any discrepancies between current and desired support to identify realistic and achievable solutions to help prevent initial or re-offending. A final tentative suggestion is that if the resources are available to do so, autistic individuals whom are at risk of offending (i.e., those experiencing adverse events or exhibiting risk factors such as those described within this paper) then the support that they are offered should be increased and aligned with their current needs.

Comparisons can be drawn between the motivations for offending reported by autistic offenders and TD sexual offenders. The ITSO is a model of TD sexual offending which provides an integrated overview of the causes of offending in TD sexual offenders. Comparisons between the ITSO and self-reported motivations for autistic sexual offending can be made. For example, the reasons provided in the “inadequate control” theme of this research

could be categorised within the "action section system" of the ITSO. Furthermore, some of the subthemes within the "disequilibrium" theme of this research (e.g., significant life event, instability) could be categorised within the "ecological niche" factor of the ITSO. However, there are a number of areas which require further investigation before being able to conclude whether factors which lead to TD sexual offending also do in ASD. For example, the "perception and memory" system of the ITSO is reported to be used to process incoming sensory information to form representations which can then be used by other systems, however sensory processing difficulties are common in autistic non-offenders with research indicating 94% of autistic adults had abnormal sensory processing (Crane, Goddard, & Pring, 2009). Consequently, further information would be required to disentangle the role of sensory processing issues in autistic offenders before conclusions could be drawn about the applicability of this system. It would also be difficult to apply the "social difficulties" element of the ITSO to autistic sexual offenders as these form part of the diagnostic criteria for ASD (APA, 2013). Future research should look to objectively quantify the element of the ITSO to enable comparison of autistic sexual offenders and autistic non-offenders to identify whether the ITSO is applicable to autistic sexual offenders.

One possible limitation of this research is the use of self-report with the autistic offenders. Previous research has suggested that autistic individuals may have difficulty with expressing themselves or may under-report the difficulties they experience (Findon et al., 2016; Hesselmark, Plenty, & Bejerot, 2013; Mazefsky, Kao, & Oswald, 2011; Shalom et al., 2006). However, to date, no research has asked autistic sexual offenders what they perceive the reasons for their offending were. ASD is a disorder which is characterised by a rigidity in thinking (APA, 2013) thus highlighting the importance of understanding the autistic offenders themselves believe that they committed the crimes that they did. Future research may benefit

from including parent, caregiver or professional opinion also to identify any differences in perception.

A further limitation is that the current research only included those in prison or probation services (i.e., convicted sex offenders); thus, findings may not be reflective of those who do not enter the CJS (e.g., those in forensic hospitals), those who evade the CJS entirely, or individuals who experience different ASD symptomology or biopsychosocial factors to those interviewed within this study. The use of only convicted sex offenders may influence findings for a number of reasons, including that they may have been engaged with interventions which could have influenced how they reported their offending behaviours or even their understanding of their motivations. A further limitation is that the research relied on individuals being willing to discuss a sensitive topic, which may have led to a selection bias during the recruitment, which may in turn influence the findings. Additionally, this research did not include individuals who were engaging in sexually inappropriate behaviours and at risk of sexually offending but who had not yet come into contact with the Criminal Justice System. Future research should investigate individuals' reasons for engaging in these sexually inappropriate behaviours to help to inform pre-offending interventions.

Finally, a further limitation is the reliance on CJS staff to identify individuals as having a diagnosis of ASD. The validity of this could be questioned (e.g., individuals may have been missed or unknown to the CJS), however ethical approval and establishment protocols precluded access to the individuals' notes and individuals had to consent to the research prior to any contact with the researcher. In future research, conducting ASD diagnostic testing with the autistic offenders would be beneficial. The information about the specific ASD difficulties identified in diagnostic assessments could then be compared to the reasons for the offending behaviours. This would further inform understanding about whether individuals with ASD differ to TD offenders in their motivations.

Of course, suggestions for practice are tentative given the small sample size (n = 9). Although data saturation was reached (with no new themes or sub-themes emerging after participant five), it is possible that if greater numbers of offenders were interviewed, more themes may emerge. Future research should seek to conduct similar interviews with a larger sample of autistic offenders to identify whether any further themes or sub-themes emerge.

In summary, the present findings provide a preliminary exploration of the self-reported reasons that autistic individuals believe led to their offending. Social skills difficulties, lack of perspective, misunderstanding the seriousness of behaviours and a lack of appropriate relationships all appeared to precede sexual offending in the current sample of autistic adults, but a period of disequilibrium was most common prior to committing the sexual offence. There is a need to develop tailored sex and relationship education packages which cater to the needs of autistic individuals (e.g., thought rigidity, ToM difficulties) and methods to identify when an individual is at risk of offending and the support they should receive. Participatory design, which has been shown to be effective for designing ASD tailored interventions (Fabri et al., 2016), is a useful framework to go about this. In conclusion, future research should investigate the role of disequilibrium in ASD sexual offending and should develop ASD specific sex and relationship education packages which also include information about the law.

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Post Academic Paper Three Commentary

Chapters Two and Three had solely used the academic literature to identify which variables to measure, however this did not appear to provide a good basis for differentiating the groups. Thus, Chapter Four adopted a different method by asking the sexual offenders themselves why they thought that they engaged in the offending behaviours. This approach provided a rich and informative data set and appeared to be a very effective method to help improve understanding of offending across the spectrum.

In order to help to achieve the overall thesis aim of improving understanding of offending behaviours and the autism spectrum, Chapter Four aimed to answer the following question: What are the self-reported motivations for autistic sexual offending? The results indicate that there were five main motivation themes for engaging in sexual offending: (1) social difficulties; (2) misunderstanding; (3) sex and relationship deficits; (4) inadequate control; and (5) disequilibrium and that the most frequently reported sub-themes were social skills difficulties, lack of perspective, misunderstanding the seriousness of their behaviours and lack of appropriate relationships. Chapter Four identified the importance of using a mixed methods approach when engaging in research investigating offending across the spectrum and this approach informed the final study of this thesis.

Chapter Five

Predictors of cyber-dependent deviancy and self-reported reasons for engaging or desisting from cyber-dependent offending

Chapter Rationale

Thus far, this thesis has included only offenders *diagnosed* with ASD with those included reported to have committed more traditional offences (e.g., rape, assault), however this thesis aims to investigate offending *across* the autism spectrum not just those with a formal ASD diagnosis. Previous research has suggested a link between autistic traits and cyber-depending offending (Leddingham & Mills, 2015; National Crime Agency, 2017; Seigfried-Spellar, O'Quinn & Treadway, 2015), however to date no empirical research has tested this hypothesis, which may have negative repercussions for autistic individuals. Aside from a desire to understand offending across the spectrum, cyber-dependent crime accounts for one fifth of all crimes committed in England and Wales (year ending June 2017) (Office for National Statistics, 2017) yet very little is known about the characteristics and motivations of this group. Chapter Four highlighted the importance of including qualitative methods to understand autistic sexual offender motivations however, the reasons for engaging in cyber-dependent crime may be different to sexual offending. This highlights the need to adopt a mixed methods approach to research the characteristics (e.g., autistic traits) and motivations of cyber-dependent deviants and offenders.

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<tr><td colspan="10">This declaration concerns the article entitled:</td></tr>
<tr><td colspan="10">Predictors of cyber-dependent deviancy and self-reported reasons for engaging or desisting from cyber-dependent offending</td></tr>
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Formulation of ideas: Predominantly executed (90%)
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Experimental work: Predominantly executed (95%)
Presentation of data in journal format: Predominantly executed (90%)</td></tr>
<tr><td>Statement from candidate:</td><td colspan="9">This paper reports on original research I conducted during the period of my higher degree by research candidature.</td></tr>
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Abstract

Previous research suggests that computers and the internet may be attractive to individuals with autism spectrum disorder (ASD) for multiple reasons. The National Crime Agency reports and high-profile media cases have raised questions over a possible link between autistic traits and cyber-dependent offending. The current study investigated whether autistic traits, explicit social cognition, interpersonal-support and digital skills were significant predictors of cyber-dependent deviancy, and the reasons for engaging in or desisting from cyber-dependent offending. Data from 175 cyber-skilled non-offenders were collected alongside preliminary data from seven cyber-dependent offenders. Results indicated that only advanced digital skills significantly predicted cyber-dependent deviancy. Seven main reasons for desisting from offending were identified: (1) sticking to morals; (2) proposed behaviour being too risky; (3) being afraid of consequences; (4) not wanting to; (5) wanting to adhere to the law; (6) behaviour being too complicated; and (7) price being too low. Preliminary cyber-dependent offender data indicated offenders differed to non-offenders on demographic, psychological and digital-skills variables. Cyber-dependent offending motivations were: (1) lack of understanding; (2) entertainment; (3) social motivations; (4) experience and career; (5) anonymity and risk perception; (6) life events; and (7) morals. These findings highlight the need for tailored cyber and legal education.

Keywords: offending; cyber skills; cybersecurity; autism; autistic traits; social cognition; interpersonal support; employment

Predictors of cyber-dependent deviancy and self-reported reasons for engaging or desisting from cyber-dependent offending

Around 1% of the general population is estimated to have a diagnosis of autism spectrum disorder (ASD) (Baird et al., 2006; Brugha et al., 2011) which is a life-long disorder characterised by persistent deficits in social communication and interaction coupled with restricted and repetitive patterns of behaviour, interests or activities (American Psychiatric Association, 2013). Computers and the internet have been suggested to be attractive to autistic individuals for several reasons, including factors relating to systemising, predictability and controllability (Baron-Cohen, 2002; 2010). Computers also provide an effective method of communication for individuals who find face-to-face interaction difficult, and facilitate communication with similar others (Benford & Standen, 2009; Gillespie-Lynch et al., 2014; Mazurek, 2013; Van der Aa et al., 2016).

Autistic individuals often show a preference for predictable and controllable systems (Baron-Cohen, 2002; 2010), with a greater interest in systems (rather than people), a desire for controllable experiences (Baron-Cohen, 2002, 2010), and intolerance to change (Pelicano & Burr, 2012; Rogers, Glod, Connolly, & McConachie, 2012: Wigham, Rodgers, South, McConachie, & Freeston, 2015). They are also posited to have a cognitive style whereby the focus is on the constituent parts of an object or environment rather than the whole (Frith, 1989; Happe & Frith, 2006), which may result in superior technical cyber skills such as coding, although this is yet to be tested. Computer programming and coding are the processes which ultimately instruct a computer or network to behave in a certain way (Van Roy & Harida, 2004), and a single mistake or deviation in a code may lead to a different computer function than intended. Thus, a preference for systemising and processing constituent parts (i.e., individual letters, words, numbers) rather than the whole (i.e., entire code input or programme) may lend to superior abilities in writing code and identifying errors within this

environment. Indeed, recent research indicates that autistic traits may be predictive of cyber abilities (Seigfried-Spellar, O'Quinn & Treadway, 2015).

Social communication and interaction difficulties are at the core of ASD diagnostic criteria (APA, 2013) and research suggests that autistic individuals experience high levels of loneliness (Mazurek, 2014; Sundberg, 2018; Van der Aa et al., 2016), with up to 50% of autistic individuals reporting having only one friend (Helles et al., 2017; Eaves & Ho, 2008; Balfe & Tantam, 2010). Within typically developing (TD) offender populations social support is a factor implicated in risk of engaging in crime, with the quality of social support that an individual receives in their immediate social network negatively associated with their criminal risk and other risk behaviours such as substance use and sexually risky behaviours (Maschi, 2006; Schroeder, Bulander, Giordano, & Cernkovich, 2010; Skeem, Eno, Manchak, Vidal, & Haddad, 2009; Spohr, Suzuki, Marchall, Taxman, & Walters, 2016; Ten Have, de Graaf, van Weeghel, & van Dorsselaer, 2014). A lack of social support may also be an influential factor in general cyber-dependent offending, although to date this has not been tested.

Computer-mediated communication has been reported to increase autistic individuals' satisfaction with their social life (van der Aa et al., 2016). Individuals with higher autistic traits are reported to make more friends and acquaintances online compared to TD individuals (van der Aa et al., 2016). Factors which increase the perceived benefits of internet interaction for autistic individuals include: increased comprehension and time to think (Gillespie-Lynch et al., 2014; Van der Aa et al., 2016); greater control (e.g., topics, turn-taking) and opportunities to practise (Benford & Standen, 2009; Gillespie-Lynch et al., 2014); the simplicity of the format (e.g., text) with non-verbal cues (e.g., facial expression, eye contact, tone of voice) removed (Gillespie-Lynch et al., 2014; Van der Aa et al., 2016); reduced stress (e.g., less judgement, greater anonymity, feeling safer and less vulnerable)

(Benford & Standen, 2009; Carter et al., 2012); greater flexibility in pace of interaction (Benford & Standen, 2009); rules and moderation for structure and guidance in online forums (Benford & Standen, 2009); increased ease to express self (Carter et al., 2012; Van der Aa et al., 2016); and convenience of interaction access (Carter et al., 2012).

The purpose of using the internet differs for autistic and TD individuals, with autistic individuals using it to meet new people whereas TD individuals are reported to use it to maintain existing relationships (Gillespie-Lynch et al., 2014). Sharing interests online is a common use of the internet for autistic individuals (Gillespie-Lynch et al., 2014) and a desire to meet new individuals who share similar interests suggests that autistic individuals may be more likely to use online forums where users share certain technical skills (e.g., gaming). It has been suggested (National Crime Agency, 2017) that social relationships developed online are key to progressing into cybercrime with forum interaction and reputation development key drivers of cyber-dependent criminality. Increased exposure to such environments coupled with increased loneliness (Mazurek, 2014; Sundberg, 2018; Van der Aa, 2016), social vulnerability (See Thesis Chapter Three; Sofronoff, Dark & Stone, 2011) and compliance (Chandler, Russell, & Maras, in press; North, Russell, & Gudjonsson, 2008; See Thesis Chapter Three) offers some support for the hypothesis that some autistic individuals (or those with higher autistic traits) may be vulnerable to coercion to engage in cyber-dependent offending, as suggested in offline research (e.g., Archer & Hurley, 2013; Blackburn & Howlin, 2004 Murrie, Warren, Kristiansson & Dietz, 2002).

Perceiving, processing and interpreting information from others is critical in guiding how one responds to the requests of others, and it has been suggested that there are two levels of social cognition; implicit and explicit (Frith & Frith, 2008). Explicit social cognition is a more conscious, slower and a more controlled process whereas implicit social cognition is quicker and a less conscious process (Frith & Frith, 2008). Autistic individuals have been

found to not significantly differ in explicit social cognition of violations of social norms compared to TD participants, but they are reportedly impaired on implicit social cognition (Callenmark, Kjellin, Ronnqvist, & Bolte, 2014). It is suggested that autistic individuals may be able to acquire explicit social cognition through explicit teaching of typically implicit rules. For example, it is suggested that autistic individuals are able to pass social cognition tests which are based on social situations because the narrative contains the necessary facts to apply rules and logical reasoning (Callenmark et al., 2014; Frith, 2004). Thus, an alternative hypothesis is that autistic individuals are less likely to engage in cyber offending if explicitly taught the rules (i.e., what is acceptable and law-abiding behaviour). The online environment, with the removal of verbal cues and reduced stress, may allow the individual more time to think, and to employ explicit social cognition reasoning and explicitly learnt rules to consider the request and its possible consequences, thus potentially leading to a greater resistance to offending.

Cybercrime is predominantly divided into two categories: cyber-enabled crime and cyber-dependent crime. Cyber-enabled crimes are 'traditional' crimes that are not reliant on computer technology that can be up scaled through the use of a computer, computer network or other information communication technology (e.g., fraud, McGuire & Dowling, 2013). Cyber-dependent crimes refer to crimes which cannot be committed without the use of a computer, computer network or other form of information communication technology (ICT) (McGuire & Dowling, 2013; The National Crime Agency, 2016), such as the creation and spread of malware, hacking, and denial of service attacks (McGuire & Dowling, 2013; The National Crime Agency, 2016). Cyber-dependent offences are the focus of the current study due to the lack of research into this area despite the growing threat and cost to the economy (The National Crime Agency, 2016). To highlight the importance of this, in the year ending June 2017, computer misuse offences accounted for over one fifth of all reported offences in

England and Wales, with 1.6 million computer misuse offences reported (1.1 million virus-related offences and 0.5 million incidents of unauthorised access to personal information) (Office for National Statistics, 2017). This is higher than more traditional crimes such as violence (1.24 million offences), burglary (667,000 offences), and robbery (132,000 offences) (Office for National Statistics, 2017). Despite this, relatively little is known about this offender group. Increasing amounts of anecdotal evidence from the National Crime Agency (National Crime Agency, 2017) and high-profile cases of UK-based individuals with Asperger syndrome, such as that of Gary McKinnon (who hacked into US military databases looking for information about UFOs) and Laurie Love (alleged to have stolen data from US agencies, including the Federal Reserve, the US army, the defence department, NASA and the FBI), have raised questions about the role of autistic-like traits in cyber-dependent crime, although no research has been conducted to investigate these claims.

Reports indicate that cyber-dependent offenders are typically male (National Crime Agency, 2017) and young (i.e., average age of suspects and arrests made by the National Cyber Crime Unit in 2015 was 17 years old compared to 37 years old for drug offences) (National Crime Agency, 2017). Hackers in particular are reported to have a higher than average IQ but adolescent hackers struggle in school due to inadequate teaching and education systems (Chiesa, Ducci, & Ciappi, 2009). A study looking at cyber deviancy (e.g., hacking, virus writing, identity theft, cyber bullying) and autistic traits in college students found that only 0.01% of individuals engaging in cyber deviant behaviour scored above 32 on the AQ-50 which indicates the possibility of ASD (Seigfried-Spellar, O'Quinn & Treadway, 2015). An individual who scores greater than 32 is suggested to seek referral for a full ASD diagnostic assessment (Baron Cohen et al., 2001). The 0.01% prevalence rate reported here is lower than the reported 1% prevalence of ASD in community samples (e.g., Baird et al., 2006; Brugha et al., 2011). Whilst this provides no support for the notion of a link between

cyber offending and autistic traits, this could be due to the inclusion of both cyber-enabled crimes (e.g., cyber-bullying) and cyber dependent crimes (e.g., hacking). Both crimes rely on different strengths and abilities with the cyber-dependent crimes (e.g., hacking, DDos) being more aligned with the cognitive profile of autistic individuals (e.g., preference for local rather than global processing).

A study reporting law enforcement employees' experiences and contact with autistic cybercriminals (Ledingham and Mills, 2015) indicated that some autistic individuals commit cyber-dependent offences. Offences committed include: hacking; creating coding to enable a crime to be committed; creating, deploying or managing a bot or bot-net; malware; child exploitation and/or pornography; and obtaining and/or using compromised payment card information (Ledingham & Mills, 2015). This was a small-scale study, limiting the generalisability of findings, but it does indicate a presence of autistic offenders within cyber-dependent crime populations, although the link between ASD and cyber-dependent crime remains largely speculative. Further clarification of the profile of cyber-dependent offenders is required to inform interventions.

In summary, previous research indicates that individuals with higher autistic traits may have preferences (e.g., for predictability and controllable systems) and a cognitive style which may increase the attractiveness of computer systems. They may also be attracted to the internet due to the perceived benefits of computer-mediated interaction (e.g., greater processing times, fewer social cues to process, easily finding others with similar interests). Recently, increasing amounts of anecdotal evidence from the National Crime Agency and high-profile cases have suggested a link between ASD and cyber-dependent offending; however research with cyber-deviant individuals questions this link.

Within this paper, the term cyber-dependent offenders refers to individuals who have been in contact with the CJS as a result of their cyber behaviours (e.g., hacking, DDoS).

Thus, their behaviours have escalated to a level which required CJS involvement. However, cyber-dependent deviancy refers to individuals whose behaviours are on the periphery of offending but, to date, their behaviours have not resulted in CJS involvement.

The first aim of the current research was to identify whether there is a link between cyber-dependent deviancy (i.e., behaviours on the fringe of offending, but to date have not resulted in CJS involvement) and autistic traits, explicit social cognition, interpersonal support and digital skills. It was hypothesised that cyber-dependent deviancy would be predicted by higher autistic traits and digital skills, but poorer explicit social cognition and interpersonal support. The second aim was to identify whether cyber-skilled individuals had been approached to engage in cyber-deviant behaviour, and if so what the reasons were for desisting from deviant behaviours. No predictions were made given the dearth of literature in this area. Thirdly, no research has quantifiably measured autistic traits, digital skills, explicit social cognition and interpersonal support within a cyber-dependent offender sample (i.e., those who have been in contact with the CJS for their cyber behaviours); thus, this study presents preliminary data (autistic traits, explicit social cognition, interpersonal support, digital skills) from a small group of cyber-dependent offenders. It was hypothesised that the cyber-dependent offenders would possess higher autistic traits and digital skills but demonstrate explicit social cognition deficits and lower interpersonal support than non-offenders. The final aim of this research was to provide an understanding of the motivations for engaging in cyber-dependent offending as described by the offenders themselves.

In summary, this research aimed to answer the following questions:

1. Is cyber-dependent deviancy predicted by demographic (i.e., age, sex, IQ), psychological (i.e., autistic traits, explicit social cognition, interpersonal support) and digital skills (i.e., basic skills, advanced skills)?

2. Have cyber-skilled individuals been approached to commit cyber-dependent crimes and, if so, what are the reasons for not engaging in offending behaviours?
3. Do preliminary data obtained from cyber-dependent offenders indicate differences in demographic factors, psychological factors, and digital skills?
4. What are the self-reported motivations for engaging in cyber-dependent offending?

Method

Sample

In total, 182 participants were included in the study. The sample was composed of 175 cyber-skilled participants who reported having not engaged in offending (115 male; 60 female) and seven cyber-dependent offenders (7 male). The non-offender participants were recruited through various channels including the University of Bath computer science department and the Cyber Security Challenge; an organisation looking to promote the development of cyber-skilled individuals.

The cyber-dependent offenders were recruited via the National Crime Agency (NCA) in the UK. In total 105 individuals were identified by the NCA, of which 38 were deemed unsuitable for the research by the NCA for reasons identified in Table one. The remaining participants (n = 67) were then sent invitation letters asking them to contact the researcher if they were willing to participate in the research. In total, seven cyber-dependent offenders were recruited via the NCA, a response rate of approximately 10%.

Table 1. Reasons for exclusion (NCA imposed) from the current study

Reason	n
History of violence	1
Under 14 years	2
No computer misuse act offence	16
Potentially involved in ongoing offences	9
Mental illness	3
Under National Offender Management Service	2
Impacts current circumstances	1
Low intelligence	4
Total	**38**

The exclusion criteria for this research were: under 14 years old; head injury or untreated epilepsy. Ethical approval was sought and obtained from the University of Bath Psychological Ethics Committee (reference number: 17-006).

All participants (offenders and non-offenders) completed The Raven Matrices Sub Scale 1 measure of non-verbal IQ. Table two shows the age and IQ data for each group.

Table 2. Age and IQ scores for cyber-dependent offenders and cyber-skilled non-offenders with standard deviations in parentheses

	Cyber-skilled non-offenders (n = 175)	**Cyber-dependent offenders (n = 7)**
Age	24.41 (10.27)	18.29 (3.30)
IQ (Raven's Progressive Matrices)	10.06 (2.48)	8.71 (1.50)

Procedure

All participants completed following questionnaires online via the survey platform Qualtrics: The Autism Quotient 50 (Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001); The Informal Test of Social Know How (Dewey, 1974); Interpersonal Support Evaluation List – 12 (Cohen, Mermelstein, Kamarck, & Hoberman, 1985); and the Digital Skills Questionnaire. The cyber-dependent offenders were then asked all of the question included in the cyber-dependent offending questionnaire (appendix 3) within an interview situation whereas the non-offenders answered questions 7-10 from the cyber-dependent offending questionnaire (appendix 3) online via Qualtrics.

Measures

The measures completed included the Autism Quotient-50 (AQ-50) (Baron-Cohen,Wheelwright, Skinner, Martin, & Clubley, 2001), Informal Test of Social Know-How (IToSK) (Dewey, 1974), Interpersonal Support Evaluation List – 12 items (ISEL-12) (Cohen, Mermelstein, Kamarck, & Hoberman, 1985), a digital skills questionnaire and a cyber-dependent offending questionnaire. The cyber-dependent offenders also engaged in a semi-structured interview to ascertain the reasons for engaging in the cyber-dependent offending behaviours.

The Autism Quotient (AQ-50).

The AQ-50 (Baron-Cohen et al., 2001) is a 50-item questionnaire which asks participants to indicate their agreement to 50 statements (e.g., I prefer to do things with others rather than on my own) using a 4-point Likert scale (from definitely agree to definitely disagree). The AQ-50 is a widely used and recognised screening tool to quantify autistic traits. It was previously recommended that individuals scoring a total score above 32 who are experiencing distress should be referred for a full ASD diagnostic assessment (Baron-Cohen

et al., 2001). However, whilst this threshold was suggested to correctly identify those with ASD, subsequent research suggests that for a clinically referred sample where the diagnosis is already suspected, a cut-off of 26 is appropriate, while in a general population sample, where there are no clinical concerns, a cut-off score of 32 may be most appropriate (Ruzich et al., 2015; Woodbury-Smith, Wheelwright & Baron-Cohen, 2005).

The AQ-50 comprises five subscales: social skills; attention to detail; attention switching; communication; imagination. A number of items in the measure are reverse scored. The AQ-50 demonstrates good reliability (α.=75-.84) (Broadbent et al., 2013) and validity (ROC=.78) (Woodbury-Smith et al., 2005). Higher scores on the measure are indicative of greater numbers of autistic traits.

Informal Test of Social Know How Test (IToSK).

The informal test of social know-how (IToSK) (Dewey, 1974) is an eight-item test of explicit social cognition. It asks participants to rate how people would judge certain behaviours throughout different scenarios. Judgements are made on a four-point scale from fairly normal behaviour in that situation to shocking behaviour in that situation. This test was selected on the basis that is a less well-known assessment, and is therefore more likely to reflect individual ability rather than practise effects. Lower scores are indicative of better social know how (i.e., explicit social cognition). To score this test, data was collected from a sample of an additional 114 individuals to obtain UK norm data (see Appendix 6 for scores). The norm data sample comprised 27 males and 87 females (mean age = 32.79; SD = 16.72).

The Interpersonal Support Evaluation List – 12.

The Interpersonal Support Evaluation List – 12 (ISEL-12) (Cohen et al., 1985) is a 12-item questionnaire in which participants rate how well a statement (e.g., I don't often get invited to do things with others) applies to them. Responses are indicated on a four-point

scale (from definitely true to definitely false) with half of the items being reverse scored. The questionnaire has good statistical properties demonstrating good internal consistency with values between .80-.86 (Merz et al., 2014). Higher scores are indicative of greater interpersonal support.

The Digital Skills Questionnaire.

The Digital Skills Questionnaire was designed using information from the National Crime Agency in order to gauge participants' level of computer skills and behaviours. It firstly collects demographic information (e.g., age, sex, occupation) before obtaining data on three subscales: basic skills; advanced skills; cyber-dependent deviancy. The basic and advanced skills subscales provide participants with a series of statements which the participant rates on a five-point Likert scale (from not at all true of me to very true of me). The basic skills statements include statements such as, "I know how to open downloaded files" whereas the advanced skills statements include statements such as, "I know how to use one of the scripting languages including the BASH shell (e.g., Perl, Python, Ruby)". The final section asks about cyber-deviant behaviours and whether the individual has undertaken any of the following activities: phishing (sending bogus emails asking for security information and personal details); webcam managing (taking over someone's webcam); file hijacking (hijacking someone's files without their permission); keylogging (recording what someone types on their keyboard); screenshot managing (taking screenshots of someone's computer screen); employing ad clicking (directing someone's computer to click on a specific link); hacking (accessing computer systems); and launching distributed denial of service (DDoS) attacks (targeting a computer system to prevent it working). Higher scores on each of the sections are indicative of a greater number of digital skills or deviance. This questionnaire demonstrated good reliability ($\alpha = .92$) and was also considered to have good face validity due to its apparent ability to effectively measure the digital abilities of the participants.

However, future research should conduct validation studies so that we can be certain of the validity of the measure. The Digital Skills Questionnaire can be found in Appendix 7.

Cyber-dependent offending questionnaire/interview

This measure was designed to obtain information about the reasons for engaging or desisting from cyber-dependent offending (see appendix 8). The offenders were asked all of the questions in an interview situation whereas the non-offenders were asked only questions 7-10 via the online questionnaire. The questions asked solely to the offenders were those found to be effective to understand the motivations for offending in previous research (Payne, Maras, Russell, & Brosnan, *In Review).* Questions 7-10 were designed to ascertain whether individuals had been approached to engage in cyber-dependent offending (yes/no) and, if yes, open-ended responses were collected detailing how the person had approached them (e.g., via game, online forum, face-to-face), whether the individual had engaged in the behaviour, and finally their reasons for engaging or desisting from the behaviour.

Data Analysis plan

All data were normally distributed with all skewness values between -0.45 and 1.82 and kurtosis values between -0.92 and 1.68. The first research question to be answered was whether demographic, psychological and digital skills predict cyber-dependent deviancy? An a prior power analysis individuated that 105 participants would be required to have 80% power for detecting a small effect size using the statistical significance criterion of 0.05. Due to the exploratory nature of this research, bivariate correlations were run between AQ-50, IToSK, ISEL-12, Basic digital skills, advanced digital skills and cyber-dependent deviancy to identify any potentially significant relationships. Following this, hierarchical regressions were run with three separate models to identify the significant predictors of cyber-dependent deviancy. Model one included demographic factors (i.e., age, sex and IQ), model two included demographic and

psychological factors (i.e., AQ-50, IToSK and ISEL-12), and model three included demographic factors, psychological factors, and digital skills (i.e., basic and advanced). Following AQ-50 total being identified as a significant predictor in model two, AQ-50 total was removed, and the five individual AQ-50 subscales were included instead (social skills, attention to detail, attention switching, communication, imagination) to identify whether any of the subscales were significant predictors. The second research question of, whether cyber-skilled individuals had been approached to commit cyber-dependent offences and their reasons for desisting was answered by firstly calculating the percentage of individuals who had been approached to engage in cyber deviant behaviours; and secondly by thematically analysing their written responses to the open-ended questions for reasons for desisting. Thematic analysis was conducted in line with the guidance from Braun and Clarke (2006). The data were coded at an explicit level with the researchers not looking beyond what the interviewee had said. Interviews were not coded according to a pre-determined framework but were coded in a data driven, inductive fashion (Braun & Clarke, 2006). Ideally, themes would occur more than once however the number of times a theme occurred did not influence its importance to the research (Braun & Clarke, 2006). The data are presented with the number of occurrences simply for practical reasons (i.e., to best inform interventions and where CJS should focus funding for maximum offender prevention effects). A second coder (KM) coded approximately 30% of the written responses. To ensure inter-rater reliability eachcoder (KP; KM) coded independently initially, each of the themes and sub-themes identified by each coder were then discussed and agreement within the coding was reached. Throughout the process it was clear, although sometimes the names of the identified themes and sub-themes differed, the underlying understanding of the theme was the same.

To answer the third research question of whether preliminary cyber-dependent offender data indicated differences in demographic factors, psychological factors and digital skills, the

data from the sample of cyber-dependent offenders were visually compared to the non-offender sample as it was not possible to run statistical tests due to the small sample size. To answer the fourth research question of what the self-reported motivations for engaging in cyber-dependent offending were, the interviews were transcribed verbatim and initially analysed by the first author using thematic analysis in accordance with Braun and Clarke (2006) as described above. A second coder (KM) coded approximately 30% of the interviews and coding agreement was reached.

Ethics

The ethical procedures for the offenders and cyber deviants. For the offenders, two weeks prior to participation, individuals received an information sheet explaining the study. Prior to participation written consent was obtained and at the start of each interview verbal consent was recorded to confirm consent to record the interview. For the participants who only completed the online questionnaire (i.e., cyber deviants, cyber skilled individuals) these individuals provided their consent via the online questionnaire platform, Qualtrics. Information and consent forms can be found in Appendix 9. Ethical approval was obtained from the University of Bath Department of Psychology Ethics Committee.

Results

Do demographic, psychological and digital skills predict cyber-dependent deviancy?

Within the non-offender group, when controlling for demographic factors (i.e., age, sex, IQ), significant correlations between AQ-50 total and basic digital skills (r = .19, p = .012), advanced digital skills (r = .23, p = .002) and cyber-dependent deviancy (r = .16, p = .032) were identified. This indicates that higher autistic traits were related to better basic and advanced digital skills and greater engagement in cyber-deviant behaviours. A significant correlation was also identified between IToSK and advanced digital skills (r = .27, p < .001)

indicating that poorer explicit social cognition is associated with better advanced digital skills. The correlations and mean data are displayed in Tables three and nine, respectively.

Table 3. Correlations controlling for demographic factors

	AQ-50	IToSK	ISEL-12
Basic digital skills	.19*	.10	.02
Advanced digital skills	.23**	.27***	.01
Cyber-dependent deviancy	.16*	.07	-01

* $p < .05$, ** $p < .01$, *** $p < .001$

Regression model one which included demographic factors (i.e., age, sex, IQ) did not significantly predict cyber-dependent deviancy, $F(3, 173) = .71$, $p = .549$. Table four displays the regression output for model one.

Table 4. Regression output for model one.

	B	SE	β	*t*	*p*
Model 1					
Constant	.54	.68		.80	.426
Age	.02	.01	.09	1.12	.265
Sex	.14	.30	.04	.47	.643
IQ	.00	.05	.01	.07	.944

Model two which included demographic factors (i.e., age, sex, IQ) and psychological factors (i.e., AQ-50, IToSK, ISEL-12) also did not significantly predict cyber-dependent deviancy, $F(6, 173) = 1.52$, $p = .174$). However, within model two, AQ-50 total was found to be a significant predictor of cyber-dependent deviancy ($\beta = .38$, $t = 2.41$; $p = .017$). See table five.

Table 5. Regression output for models one and two

	B	SE	β	*t*	*p*
Model 1					
Constant	.54	.68		.80	.426
Age	.02	.01	.09	1.12	.265
Sex	.14	.30	.04	.47	.643
IQ	.00	.05	.01	.07	.944
Model 2					
Constant	-1.35	1.10		-1.231	.220
Age	.01	.01	.06	.78	.439
Sex	.06	.30	.02	.19	.852
IQ	.02	.06	.03	.40	.693
AQ-50 Total	.05	.02	.23	2.46	.015
IToSK	.02	.03	.06	.70	.482
ISEL-12	.03	.02	.13	1.41	.160

Given that AQ-total was found to be a significant predictor of cyber-deviancy in model two, AQ total was replaced with the AQ sub-scales (i.e., social skills, attention switching, attention to detail, communication, imagination) and the regression analyses re-run. Table six provides the regression output with the AQ-50 subscales included. Analyses indicate that only one AQ-50 subscale significantly predicted cyber-dependent deviancy was attention to detail ($\beta = .32$, $t = 4.06$; $p < .001$).

Table 6. Regression output including the AQ-50 subscale

	B	SE	β	*t*	*p*
Model 1					
Constant	.54	.68		.80	.426
Age	.02	.01	.09	1.12	.265
Sex	.14	.30	.04	.47	.643
IQ	.00	.05	.01	.07	.944
Model 2					
Constant	-.64	1.10		-.58	.561
Age	.01	.01	.08	.95	.343
Sex	-.13	.30	-.04	-.43	.670
IQ	-.00	.06	-.01	-.06	.952
AQ-50 (Social skills)	.04	.08	.07	.51	.614
AQ-50 (Attention switching)	-.05	.08	-.06	-.62	.538
AQ-50 (Attention to detail)	.23	.06	.32	4.06	<.001
AQ-50 (Communication)	.08	.09	.11	.95	.344
AQ-50 (Imagination)	-.05	.08	-.05	-.59	.559
IToSK	-.00	.03	-.00	-.03	.975
ISEL-12	.01	.02	.05	.53	.596

Initially, this suggests that autistic traits may predict cyber-dependent deviancy, however with the addition of digital skills (i.e., basic; advanced) in model three (demographic factors; psychological factors; digital skills), autistic traits no longer significantly predicted cyber-deviancy ($p = .361$). Overall, model three was the only model to significantly predict cyber-dependent deviancy ($f(9, 173) = 5.25$, $p < .001$) with advanced digital skills being the only significant predictor of cyber-dependent deviancy ($\beta = .46$, $t = 5.85$; $p < .001$) within this model. Table seven displays the regression output.

Table 7. Regression model data for prediction of cyber-dependent deviancy

	B	SE	β	*t*	*p*
Model 1					
Constant	.54	.68		.80	.426
Age	.02	.01	.09	1.12	.265
Sex	.14	.30	.04	.47	.643
IQ	.00	.05	.01	.07	.944
Model 2					
Constant	-1.35	1.10		-1.231	.220
Age	.01	.01	.06	.78	.439
Sex	.06	.30	.02	.19	.852
IQ	.02	.06	.03	.40	.693
AQ-50 Total	.05	.02	.23	2.46	.015
IToSK	.02	.03	.06	.70	.482
ISEL-12	.03	.02	.13	1.41	.160
Model 3					
Constant	-.26	2.56		-.10	.920
Age	-.00	.01	-.02	-.29	.771
Sex	.35	.28	.10	1.29	.200
IQ	-.17	.06	-.02	-.30	.763
AQ-50 Total	.02	.02	.09	1.01	.316
IToSK	-.03	.03	-.07	-.82	.414
ISEL-12	.01	.02	.02	.24	.810
Basic digital skills	-.03	.05	-04	-.50	.618
Advanced digital skills	.06	.01	.47	5.89	<.001

The regression results in combination with the earlier run correlations which indicated significant positive correlations between advanced digital skills and both AQ-50 total and IToSK suggests that whilst advanced digital skills were the only significant predictor of

cyber-dependent deviancy, individuals with advanced digital skills are more likely to have higher autistic traits and poorer explicit social cognition as measured using the IToSK.

Have cyber-skilled individuals been approached to commit cyber-dependent crimes and, if so, what are the reasons for not engaging in offending behaviours?

Approximately 17% (n = 29) of the non-offending participants reported that they had been approached to commit a cyber-dependent crime. Individuals were approached online (e.g., forum, online chat room, in-game chat) or in person. Seven main reasons were identified for desisting from offending. These are summarised in table eight.

The first reason was ***sticking to morals*** [n = 9], with participants stating that the proposed behaviour was "against my ethics" [participant 104] and that "I stick to my principles" [participant 96]. Risk was also a large part of desisting from requests; ***proposed behaviour being too risky*** [n = 9] was conveyed by statements including, "it was far too risky for me to attempt it" [participant 146]. ***Being afraid of the consequences*** [n = 7] was also a frequent deterrent with one participant stating, "I don't want to get arrested…. I saw that other people I interacted with got arrested" [participant 158] and concerns that "future ambitions likely limited by a conviction if caught" [participant 51]. Some participants reported simply ***not wanting to*** [n = 3] or stated that they didn't offend due to ***wanting to adhere to the law*** [n = 3]. Less frequently mentioned reasons included the ***behaviour being too complicated*** [n = 2] or the ***price being too low*** [n = 1].

Table 8. Reasons for desisting from proposed criminal behaviour

Reason	**n**
Sticking to morals	9
Proposed behaviour being too risky (e.g., being caught)	9
Being afraid of the consequences	7
Not wanting to	3
Wanting to adhere to the law	3
Behaviour being too complicated	2
Price being too low	1

Do cyber-dependent offenders differ from non-offenders on demographic factors, psychological factors and digital skills?

The preliminary quantitative data from the cyber-dependent offenders indicated that the cyber-dependent offenders differed on demographic factors, psychological factors and digital skills. This data is displayed in tables two and nine. Demographically, the cyber-dependent offenders were younger in age, demonstrated a lower non-verbal IQ and were more likely to be male. Psychologically, the cyber-dependent offenders demonstrated fewer autistic traits and poorer explicit social cognition. Only one (15%) of the cyber-dependent offenders scored over the suggested threshold of 26 on the AQ50 (Ruzich et al., 2015; Woodbury-Smith et al., 2005) compared to 59 (34%) of the cyber skilled non-offenders. Regarding digital skills, the cyber-dependent offenders demonstrated greater advanced digital skills and unsurprisingly a greater cyber-dependent deviancy score.

Table 9. Mean data for the non-offenders and cyber-dependent offenders (standard deviations in parentheses)

	Non-Offender (n = 175)	**Cyber-Dependent Offender (n = 7)**
Raven's Progressive Matrices	10.06 (2.48)	8.71 (1.50)
AQ-50 Total	22.23 (8.67)	18.29 (6.78)
AQ-50 Social Skills	4.01 (3.04)	2.86 (2.34)
AQ-50 Attention to detail	5.82 (2.39)	5.14 (1.57)
AQ-50 Attention switching	5.48 (2.27)	4.57 (2.07)
AQ-50 Communication	3.68 (2.37)	3.43 (2.88)
AQ-50 Imagination	3.25 (1.94)	2.29 (1.38)
IToSK	8.98 (5.31)	11.57 (3.36)
ISEL-12 Total	23.45 (7.65)	25.14 (6.87)
Basic digital skills	49.17 (2.51)	50.00 (0.00)
Advanced digital skills	35.27 (13.12)	46.14 (4.38)
Cyber-dependent deviancy	1.14 (1.74)	3.57 (2.64)

What are the self-reported motivations for engaging in cyber-dependent offending?

Seven cyber-dependent offenders were interviewed, one of whom self-reported a diagnosis of ASD (participant 3). Seven main themes were identified with regards to cyber-dependent offenders' self-reported motivations for offending (see table 10): (1) lack of understanding; (2) entertainment; (3) social motivation; (4) experience and career; (5) anonymity and risk perception; (6) life events; and (7) morals. Typically, participants reported multiple themes and sub-themes. Each theme (bold) and associated subthemes (bold italics) are described in detail in the text below.

Table 10. Reported reasons for offending provided by cyber-dependent offenders

Theme	Sub-theme	P1	P2	P3	P4	P5	P6	P7	Sub-theme total
Lack of understanding (n = 7)	Consequences	X	X	X	X	X	X	X	7
	Impact of behaviour	X	X	X		X		X	5
	Seriousness of actions	X		X	X	X		X	4
	Lack of specific education regarding cyber & the law		X	X	X	X			4
Entertainment (n = 7)	Challenge		X	X		X	X	X	5
	Curiousity	X		X	X		X	X	5
Social motivation (n = 6)	Negative influence of peers	X	X			X	X		4
	Lack of social group						X	X	2
	Grandiose				X	X	X	X	4
Experience & career (n = 4)	Long-standing cyber interest		X		X			X	3
	Desire to improve skills & pursue cyber career		X				X	X	3
	Lack of appropriate teaching methods or resources		X				X		2
	Desire for applied experience		X				X		2
Anonymity & risk perception (n = 4)	Minimal perceived risk					X	X	X	3
	Perceived anonymity		X			X		X	3
	Importance of detachment		X				X		2
Life events (n = 4)	Youth or immaturity		X		X		X	X	4
	Adverse life experiences						X	X	2
	Cyber as a coping mechanism						X	X	2
Morals (n = 1)	Reasoning			X					1
	Damage limitation			X					1

Theme One: Lack of understanding

All of the participants (n = 7) referred to a lack of understanding as a factor within their offending with all participants stating that they were unaware of the ***consequences*** (n = 7):

"I was completely unexpecting about [CJS contact] … I had no idea that it was going to be that. When they called me I was like what have I done?"

[Participant 4]

"I didn't know the severity of it [the offending behaviour] or about how bad the punishment could be …"

[Participant 5]

The majority of participants (n = 5) referred to a lack of understanding regarding the ***impact of their behaviour***. This was typically in reference to other people:

"Just understanding how it would affect people because when I did it I didn't expect it to be a massive hassle for everybody. I caused a lot of problems … A lot of hold ups … wasting people's time in general. I didn't understand it [the offending] would lead to that."

[Participant 1]

"It's very different to a real crime when you mug someone or something … it's … you're not…..it seems victimless but its not, you know…It doesn't seem like you're hurting someone else in that sense. It sort of removes that physical element…. And so it's hard to sort of say because it just still doesn't seem kind of real that it can happen…

[Participant 2]

Over half of the cyber-dependent offenders mentioned a lack of understanding of the ***seriousness*** of their behaviours. Whilst some participants indicated an awareness that the behaviours were illegal, others did not know prior to offending:

"Yes [knew it was illegal] but not to the extent that it was. I thought it was a bit shady but I didn't think it was that serious, but it was."

[Participant 1]

"I didn't know the severity of it [the offending behaviour]…"

[Participant 5]

A ***lack of specific education regarding cyber and the law*** (n = 4) was mentioned by many of interviewees, with participants either indicating total lack of knowledge:

"Really there's no education on the sort of the legislation [the law] you know…. That you're at risk when you're on a computer"

[Participant 2]

Or a degree of knowledge of the laws governing cyber behaviours but not enough to prevent the offending behaviours:

"So I might have not realised that it was illegal to actually own it … I think I knew it would be illegal to use it on other people without their consent …"

[Participant 4]

Theme Two: Entertainment

All participants (n = 7) mentioned an element of entertainment as a reason for engaging in the offending behaviours. Equal numbers of participants referred to ***challenge*** (n = 5):

"it's sort of a mind-set you know… if it's there it can be broken … it's sort of … a challenge … it's like … it's just something fun you know, being able to break into something like that. It's just interesting … not many people get to see that side of it and you just learn a lot from it as you do it"

[Participant 2]

"I was just messing around really and seeing how and why other people could do it. So it was just gaining knowledge really. That was the intent. I wouldn't say the sole intent was commit further crimes with it"

[Participant 7]

As did ***curiosity*** (n = 5):

"I was quite arrogant in just doing it [the offence] because I was just curious to see if I could do it"

[Participant 1]

"I remember testing it … like on my own computers and stuff and like telling my mates in the school playground about how cool it was … but I think it was just purely curiosity honestly."

[Participant 4]

Theme Three: Social

The majority of participants (n = 6) referred to the social theme with many participants referring to the sub-theme regarding the ***negative influence of peers*** (n = 4):

"At that time I didn't have a good friendship group … They were kinda bad influences, so that might have had something to do with it"

[Participant 1]

"the website I owned … it was a small community but we shared ideas … you know … different methods … attacks … types … techniques … and we shared with each other…

[Participant 6]

"I knew a Russian hacker when I was like 12 who gave me a list of about 20,000 steam accounts that he'd hacked and he'd hacked like an actual steam admin computer so he could log loads of info and things"

[Participant 7]

However, a couple of participants also referred to a ***lack of social group*** (n = 2) as a precursor to their offending behaviours:

"I also lost contact with some of my social circles. Coz I used to be … I used to go out with friends you know … on an everyday occurrence … but slowly you know … after college and university … I stopped for some reason … and I kinda distanced myself from … social interaction"

[Participant 6]

"…it sort of built up over a long period of time coz I was quite introverted around school … I was … I would say that I was minorly bullied but not severely bullied and it kind of made it so … erm … I didn't have as much of a social life or care as much about having a social life"

[Participant 7]

Grandiose references were made by over half of the interviewees (n = 4). This was in references to both online and offline peers:

"Yeah, well we all [the group of friends from school] do computing and we're all sort of…tech savvy… and like…. I was the only one who knew how to boot someone offline"

[Participant 5]

"to …be able to hack things gives you almost a power in your mind you know… like you feel like you're slightly above than people online"

[Participant 7]

Theme Four: Experience & career

The fourth theme of experience and career was mentioned by over half of the participants (n = 4) with a number of interviewees stating a ***long-standing cyber interest*** (n = 3):

"I mean … I've sort of always been interested in computers and … sort of … it's sort of a mind-set you know …"

[Participant 2]

"well I've always been an IT orientated person … I came out of college and I went to [global technology company]"

[Participant 7]

Equal numbers (n = 3) of interviewees also mentioned a ***desire to improve skills & pursue a cyber career***:

"Really I just wanted to sort of better my skills and get good so that I could pursue a professional errr … You know legal career in it because it was definitely of interest to me."

[Participant 2]

"I mean I was at university at the time also [studying a cyber related course] … So you know … I was doing university and it's almost like it [practising hacking in the real world] was a different but obviously it was like an illegal course."

[Participant 6]

Some participants also highlighted a ***lack of appropriate teaching methods or resources*** (n = 2) as an influence in their offending:

"… so yeah its [illegal activity] just sort of a way I test my skills because you know like virtual machines and like deliberately vulnerable servers they're not as fun as actually deploying it in the real world"

[Participant 2]

"what … I did or was doing erm ... You know I couldn't have learnt that … as in at college or a university … what I was doing. So, it's sort of … giving me yeah it's … It was like a really great learning experience …"

[Participant 6]

coupled with a ***desire for applied experience*** (n = 2)

"I was coding a lot and so it was a way for me to test my skill by actual, you know, industry sort of standards in that sense"

[Participant 2]

"the experience [hacking; having own website] … It did really help me … it was real world experience rather than learning something from university or college … it's not something you can learn like that"

[Participant 6]

Theme Five: Anonymity and Risk Perception

Anonymity and risk perception (theme five) may initially seem contradictory to theme one (lack of understanding) but in fact highlights the need for greater cyber education. This is due to the understanding of the laws surrounding the internet. For example, often confusion occurs regarding gaming behaviours. Gaming companies frequently encourage modification of their games which is technically a breach of copyright and illegal. This facilitates both misunderstanding (theme one) due to the promotion of illegal behaviours by a legitimate organisation and also risk perception (theme five) because there is no risk perceived because it is a behaviour encouraged by gaming companies. This is very different to traditional crimes such as theft or murder because these are never condoned or actively encouraged so there is a clear boundary; however, gaming companies actively encouraged modification of their games which is a breach of copyright and illegal. Four interviewees referred to anonymity and risk perception with the majority of these individuals reporting ***minimal perceived risk*** (n = 3) at the time of offending:

"so I knew it was wrong and I knew … Like I knew there was some law against it but I didn't know … errr ... how easy it was for you to get caught I guess … so I sort of took the risk and did it …"

[Participant 5]

"some things I've done in the past, like exploiting games, deleting games and all this … not so serious stuff I've got away with"

[Participant 7]

As well as element of ***perceived anonymity*** (n = 3):

"but they won't be able to catch everyone because only stupid people (aka me) bought it with PayPal whereas if I had bought the program with bitcoin it wouldn't be traceable with me which a lot of people have done, probably.

[Participant 7]

Another factor which influenced some of the offending behaviours in the current sample was the ***importance of detachment*** (n = 2):

"... you know you're behind a computer screen … it doesn't seem real … it doesn't seem like someone is going to come in and raid you and take your stuff … You're behind a keyboard … It's very different to a real crime when you mug someone or something … it's … you're not … it seems victimless but it's not, you know … It doesn't seem like you're hurting someone else in that sense. It sort of removes that physical element … And so it's hard to sort of say because it just still doesn't seem kind of real that it can happen …"

[Participant 2]

Theme Six: Life events

Life events were mentioned by a number of interviewees (n = 4). The most commonly identified sub theme referred to the ***youth or immaturity*** at the time of engaging in the illegal behaviours (n = 4):

"telling my mates in the school playground about how cool it [illegal tool & associated behaviours] was …"

[Participant 4]

"but if I was to start from when I was 12 it was just … exploiting things and games and then it sort of built up over a long period of time"

[Participant 7]

Adverse life experiences (n = 2) was mentioned by a couple of participants:

"I was raised in a pretty erm … rough neighbourhood … if you can call it that … ******** [name of neighbourhood] … So it's quite … not the best of neighbourhoods to grow up in … you know … high crime rate and what not … Maybe that had something to do with it? ... You know, it was safer for me to stay indoors and do the things that I was doing rather than go outside and get robbed or something."

[Participant 6]

"because having the depression at the time and … having that interest [cyber] I found interesting and nothing was really interesting when I had depression"

[Participant 7]

The same participants also referred to ***cyber as a coping strategy*** (n = 2) and a way of coping with the difficult events and experiences that they were going through.

"it [cyber behaviours] was also a way of you know … hacking was a way of dealing with my situation [difficult childhood/home situation]"

[Participant 6]

"… whereas [during depressive episodes] I'd go online find playing games and experimenting with hacking was the reason that I'd get up"

[Participant 7]

Theme Seven: Moral

One participant – the autistic cyber-dependent offender – referred to morals as a motivation for offending. Although he was the only participant to self-report a diagnosis of ASD, making it difficult to draw conclusions, he had a unique profile of offending which

predominantly revolved around this theme. He provided very specific and justified ***reasoning*** for his behaviours:

"The company kind of annoyed me in the fact that they wouldn't take responsibility for the vulnerability [the offender had rung them to tell them about the vulnerability he had found in their system before publishing their customer database which he had been able to access due to the vulnerability]"

[Participant 3]

However, despite publishing the company's entire customer database, he took some steps for ***damage limitation:***

"We sensitised the document [entire customer database] so that no sensitive information was leaked"

[Participant 3]

Discussion

The aims of this research were to identify whether autistic traits, explicit social cognition, interpersonal support and digital skills were predictors of cyber-dependent deviancy and to examine the non-offenders' reasons for desisting from cyber-dependent offending. We also sought to obtain preliminary data from cyber-dependent offenders (regarding autistic traits, explicit social cognition, interpersonal support, and digital skills) before exploring their self-reported reasons for engaging in cyber-dependent offending. In summary, the results indicated that, when all of the variables were included in the model, only advanced digital skills predicted cyber-dependent deviancy and that whilst autistic traits were positively correlated with advanced digital skills, they were not a significant predictor of cyber-dependent deviancy. Approximately 17% of the non-offender sample had been approached to commit a cyber-dependent offence but had desisted from doing so. Seven non-

mutually exclusive reasons for desisting were identified: (1) sticking to morals; (2) proposed behaviour being too risky; (3) being afraid of the consequences; (4) not wanting to; (5) wanting to adhere to the law; (6) behaviour being too complicated; and (7) price being too low. The preliminary cyber-dependent offender data indicated that the offenders differed to the non-offenders on demographic variables (younger in age, predominantly male, lower non-verbal IQ), psychological variables (lower autistic traits, poorer explicit social cognition) and digital skills (more advanced digital skills). Seven main themes emerged from the data regarding the reasons for engaging in cyber-dependent offending: (1) lack of understanding; (2) entertainment; (3) social motivation; (4) experience and career; (5) anonymity and risk perception; (6) life events; and (7) morals. Typically, participants reported a combination of reasons although the lack of understanding and entertainment themes were reported by all offenders. One cyber-dependent offender self-reported a diagnosis of ASD and this individual presented with a unique profile predominantly focussed on the morals of the situation.

Comparison of the reasons for engaging and desisting from offending indicate numerous parallels which can be drawn upon to inform interventions. For example, where the non-offenders stated reasons such as being aware that the behaviour was illegal and being aware or afraid of the consequences, the offenders reported reasons which demonstrated a lack of understanding of the seriousness and consequences of their behaviour. In addition, offenders spoke of the perceived minimal risk and anonymity as well as the detachment from the victim(s) due to the cyber platform, whereas the non-offenders chose to desist from offending due to a perceived high level of risk. Interventions should aim to address these reported discrepancies in understanding, and future research should investigate the preferred teaching methods to enable the intervention to have the greatest impact. For example, would individuals prefer an online course, or would this further increase the reported feelings of detachment from the real world? It is suggested that having cyber-dependent offenders that

have been convicted by the Criminal Justice System (CJS) discuss their experiences of offending and the CJS (either in-person or videos) may help to address both the element of detachment as well as the perceived minimal risk of being caught and convicted.

In addition, the cyber-dependent offenders made several comments about changes in education. Aside from the legal side of the cyber environment they referred to changes to the way that cyber courses are taught. For example, the offenders reported engaging in illegal behaviours often due to a desire to improve their skills and apply these to the real world. One participant spoke of legal challenges requiring them to use their cyber skills (e.g., 'capture the flag' events) as being a way of improving experience of cyber education; however, many of the individuals interviewed did not appear aware of these options, highlighting the need for awareness and understanding of such events. Another possible option is the use of carefully designed labs and platforms (e.g., Immersive Labs) to enable individuals to practise their skills in a safe and legal way. Future research should look to evaluate the use of such tasks in combination with education about the law in preventing reoffending behaviours.

Whilst not a predictor of cyber-dependent deviancy once digital skills were included in the model the finding that autistic traits were significantly positively correlated with advanced digital skills furthers previous research which had indicated an autistic preference for the cyber platform (e.g., Benford & Standen, 2009; Gillespie-Lynch et al., 2014; Mazurek, 2013; Van der Aa et al., 2016). Due to the range of autistic traits demonstrated, the current research indicates a spectrum-wide association between autistic traits and cyber ability which has real world implications for the recruitment and retainment of employees within the cyber domain. This is crucial given that cybercrime is the biggest threat to businesses in the world, with damages estimated to reach $6 trillion annually, and that an estimated 3.5 million cyber security jobs will be unfilled by 2021 (Morgan, 2018). The current research suggests that individuals with higher cyber abilities are likely to have

increased autistic traits. Autistic individuals are reported to have a strong sense of morality, trustworthiness and loyalty (de Schipper et al., 2016) which would be a great asset to employers. The current research further supports the advantage of employing individuals high in autistic traits when considering that when digital skills were included into the regression model, autistic traits were not a predictor of cyber deviancy. Research suggests that recognising and nurturing these skills and abilities (i.e., morality, trustworthiness, loyalty) enables individuals to reach their full potential (de Schipper et al., 2016). This highlights the need for employers to ensure that their recruitment methods and working environments are inclusive to reflect the needs of these individuals (See Hedley et al., 2017 for review).

Explicit social cognition was also correlated with advanced digital skills, indicating that as advanced digital skills increase, poorer explicit social cognition was observed however this was not found to be a significant predictor in the quantitative analyses. Typically, individuals with poorer explicit social cognition demonstrate a reduced ability to apply the rules or theories to everyday life (Frith & Frith, 2008) however this research suggests that cyber-deviant offenders have a lack of knowledge about what the rules are (e.g., the law, seriousness and the consequences of actions) which would inhibit their ability to apply them. The current research suggests that the individuals who commit cyber-dependent offences may do so because of a lack of understanding about what is socially acceptable behaviour (i.e., legal/illegal behaviour). This is further complicated by the nature of the cyber environment which, whilst offering a wealth of opportunities, also carries many 'blurred lines' which enable individuals to cross from legal to illegal online behaviour with relatively little ease and potentially unknowingly. For example, gaming modifications are technically breaches of copyright (i.e., illegal) however the gaming vendors frequently encourage this behaviour (CREST, 2015). Future research to objectively measure understanding of the rules governing the cyber environment in addition to an individuals ability to apply these to the

cyber environment specifically (i.e., a measure of explicit social cognition specific to the cyber environment) would be helpful. This could be used to assess individuals with high cyber skills and the findings used to inform interventions to help individuals to make informed choices and prevent offending behaviours.

This research includes both autistic individuals and those with high levels of autistic traits so the self-report method could be a limitation. Previous research suggests that autistic individuals may have difficulties expressing themselves or may under-report their experience using self-report (Findon et al., 2016; Hesselmark, Plenty, & Bejerot, 2013; Mazefsky, Kao, & Oswald, 2011; Shalom et al., 2006), however the use of the internet to communicate has been found help faciltiate communication in ASD (e.g., increased time to think, increased comprehension and time to think, reduced stress (Benford & Standen, 2009; Carter et al., 2012; Gillespie-Lynch et al., 2014; Van der Aa et al., 2016). Another limitation related to self-report is the reliance on individuals to accurately report their deviant behaviours. Whilst every step was taken to reassure participants of their total anonymity and the inability to identify the individuals from their online responses, it is possible that some individuals may have under-reported their behaviours for fear of repurcussions and/or social desirability bias. A further limitation related to ASD is the use of checklists not validated for ASD (e.g., the ISEL-12); however, the test was chosen due to its succinct and clear statements which was believed to be the most appropriate for this group. Future research should conduct validation studies with autistic populations to ensure that a wider array of measures are available and validated for this group of individuals. Another limitation of this research is that it relied on self-report of ASD diagnsoses because, due to the online anonymous element of the questionnaire, it would not have been possible to match up ASD diagnostic reports to the individuals whilst still retaining participant anonymity. However, given that the aim of the research was to measure autistic traits (not ASD diagnostic information) to compare to digital

skills, cyber-dependent deviancy and offending, the anonymity of participants was considered more important to meet the aims of the research.

A final limition relates to the small number of cyber-dependent offenders within this study (n=7). From a quantitative perspective this prevented statistical analyses being run with this group. An a-priori power analysis indicated that 52 participants would be required to achieve Cohen's (1992) recommendation of 80% power for detecting a large effect size using the statistical significance criterion of 0.05. This would be to run a MANOVA to see if three groups (1. cyber-dependent offenders; 2. cyber dependent deviants; 3. cyber-skilled non-deviants) significantly differ on AQ50, ISEL-12, basical and advanced digital skills. From a qualitative perspective, although no further themes emerged after participant 6, greater numbers of cyber-dependent offenders would be required in future to ensure data saturation was definitely reached. Overall, although cyber-dependent offenders are a difficult group to find, recruit and engage in research, future research should endeavour to increase the numbers of cyber-dependent offenders to enable conclusions to be drawn.

In conclusion, the only significant predictor of cyber-dependent deviancy was advanced digital skills. Despite not being a significant predictor of cyber-dependent deviancy, autistic traits were significantly positively correlated with advanced digital skills which has important implications in the real world (i.e., ASD-friendly recruitment strategies and working environments). Largely the reasons for engaging or desisting from offending mirrored each other. For example, where the offenders reported a lack of understanding of consequences, seriousness and the law, the non-offenders reported that the awareness of these factors prevented them offending. Education appears to be the key to addressing cyber-dependent offending behaviours. This includes legal awareness through teaching, resources and safe but realistic environments for individuals to practise their skills and receive evaluation (e.g., Immersive Labs, capture the flag events). Finally, whilst differences were suggested by the

descriptive data of offenders and non-offenders (e.g., autistic traits, explicit social cognition, and digital skills), future research should include a larger sample of cyber-dependent offenders to enable firmer conclusions to be drawn about the potential role of these factors in offending behaviour to inform interventions.

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Post Academic Paper Four Commentary

Chapter Five included the final academic paper of this thesis and adopted a more spectrum-wide approach to understanding offending behaviours by focussing not only on those diagnosed with ASD but by also measuring autistic traits in a general cyber-skilled sample. The research aimed to empirically test whether there was an association between ASD or autistic traits and cyber-dependent deviancy, before identifying what the self-reported motivations for engaging or desisting from cyber-dependent deviancy and offending were, using a similar semi-structured interview to that used in Chapter Four.

The findings indicated that autistic traits did not predict cyber-dependent deviancy and that the only predictor of cyber-dependent deviancy was advanced digital skills. However, autistic traits were positively correlated with advanced digital skills which perhaps is where the stereotypes and anecdotal evidence arises from. Seven reasons were reported for desisting from offending: (1) sticking to morals; (2) proposed behaviour being too risky; (3) being afraid of the consequences; (4) not wanting to; (5) wanting to adhere to the law; (6) behaviour being too complicated; and (7) the price being too low. Likewise, even themes emerged for reasons for engaging in cyber-dependent offending: (1) lack of understanding; (2) entertainment; (3) social motivation; (4) experience and career; (5) anonymity and risk perception; (6) life events; (7) morals. The reasons for engaging and desisting from cyber-dependent offending frequently mirrored each other (i.e., non-offenders referred to the behaviour being too risky whereas the offenders reported anonymity and low perception of risk). This highlighted the importance of obtaining both points of view (i.e., reasons for offending and reasons for desisting) as both would be helpful for informing interventions for preventing initial or re-offending.

Finally, the mixed methods approach employed within this study was effective at understanding cyber-dependent offending behaviours across the spectrum. This research highlights the need for future autism spectrum research to adopt a similar approach.

Chapter 6. General Discussion

The overarching aim of this thesis was to conduct theory-driven research to extend previous research to improve the understanding of offending across the autism spectrum. The methods used within this programme of research were developed in response to previous autistic offender research which highlighted the need for more robust methodology (e.g., large matched comparison groups of autistic non-offenders, TD offenders and TD non-offenders). Chapters Two to Five describe a series of progressive research studies which add to our understanding of offending across the autism spectrum. There were six main overarching research questions that this theses addressed: (1) Are there any significant differences in profiles (i.e., mental health, substance, family and childhood, behavioural conduct and moral reasoning) between autistic offenders and: (a) autistic non-offenders; (b) TD offenders; and (c) TD non-offenders?; (2) Do autistic offenders typically offend alone or with others?; (3) Do autistic offenders demonstrate a similar profile to autistic non-offenders (i.e., diminished Theory of Mind (ToM), and social motivation coupled with heightened social vulnerability, compliance and restricted interests and repetitive behaviours)?; (4) What are the self-reported motivations for autistic sexual offending?; (5) Is there an association between autism or autistic traits and cyber-dependent deviancy?; and (6) What are the self-reported motivations for engaging or desisting from cyber-dependent deviancy and offending? The main findings from these chapters will now be interpreted and discussed with reference to applicable theory (i.e., ToM, Weak Central Coherence), their implications for practice and suggested areas of future research development. Table 1 provides an overview of the findings, practical implications and areas of future research.

6.1 Interpretation of findings and application of theory

Within Chapter Two, autistic offenders scored significantly higher than autistic non-offenders on the total Offending Factors questionnaire (OFQ) and specifically on the behavioural conduct subscale of the OFQ. Whilst it is possible that the significant total score may be due to the significant difference on the behavioural conduct scale, it cannot be ignored that previous research has identified that often risk factors do not occur in isolation (James & Glaze, 2006; Lisak & Beszterczey, 2007; Messina, Grella, Burdon, & Prendergast, 2007; Sergentanis et al, 2014) and rather a combination of individual questions across the OFQ could have resulted in this significant difference in total score. The significantly higher score identified for autistic offenders compared to autistic non-offenders on the behavioural subscale was perhaps unsurprising given the content of the subscale. The behavioural subscale asked about behaviours which could have been directly related to the individual's offence(s) (i.e., verbal aggression, physical aggression, sexually inappropriate behaviour, destructive behaviour, hyperactivity). This finding was propounded by the TD offenders' significantly higher scores than the TD non-offenders. Future research should collect the OFQ data from a larger sample to enable adequate power for multinomial logistic regressions to be run to identify whether there are individual question items that predict autistic offending status from matched comparison groups (i.e., autistic non-offenders; TD offenders; TD non-offenders).

Mental health was the only factor in Chapter Two which significantly differed between autistic offenders and TD offenders and although this appeared to be a factor associated with ASD diagnosis (i.e., autistic non-offenders also scored significantly higher than TD non-offenders) this finding has significant practical implications. Whilst both offending groups reported high psychiatric diagnoses rates, this was higher in autistic offenders (67%) than TD offenders (45%) highlighting the importance of psychiatric

screening if an ASD diagnoses is disclosed within the CJS. Worryingly, however, previous research has suggested that up to 75% of autistic offenders were not diagnosed until coming into contact with the CJS (Kumagami & Matsuura, 2009). It is concerning that individuals are reliant on the CJS for ASD diagnosis especially given that the literature indicates that autistic individuals have difficulties within the CJS (Allen et al., 2008; Helverschou et al., 2015; 2018; Newman, Cashin, & Waters, 2015; Patterson, 2008) but that when adaptations are made (e.g., appropriate adults, moved to a different wing) their experience improves (Allen et al., 2008). There are a number of issues which may interfere with the likelihood of referral for ASD diagnostic assessment within the CJS that future research should address. Firstly, research suggests that the currently available ASD screening tools are unsatisfactory for adults (Baghdadli, Russet, & Mottron, 2017). In addition, diagnostic referral would be dependent on someone noticing that that an offender is struggling however the National Audit Office (2017) found that 40% of prisons in England and Wales did not provide mental health refresher training to staff which may impact upon abilities to identify individuals requiring referral or what to do if a referral is required. Finally, the prison service is overcrowded with 72% of prisons in England and Wales operating in crowded conditions, with about 17% of all prisoners being held in crowded conditions (Ministry of Justice, 2018) which may limit staff interaction which may consequently prevent or delay referral for diagnostic assessment.

Chapter Three did not identify any significant differences between autistic offenders and autistic non-offenders however the research still contributed to our understanding of autistic offenders and highlighted a number of practical implications. Firstly, both autistic offenders and autistic non-offenders were found to be significantly more socially vulnerable than TD non-offenders. Previously research on social vulnerability had only been conducted with autistic children (Sofronoff, Dark & Stone, 2011) however the present research

demonstrates that the difficulty detecting or avoiding potentially harmful interpersonal interactions (Pinsker, Stone, Pachana, & Greenspan, 2006) extends into adulthood. The practical implication of this is important when considering the potentially malicious intentions of TD offenders within the CJS environment.

Furthermore, social motivation (i.e., reduced enjoyment of the company of others and likelihood to work to maintain relationships; Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012) was found to be diminished in both the autistic groups (i.e., offenders; non-offenders) compared to TD non-offenders which may lead to autistic offenders experiencing increased difficulties within the CJS. For example, the previous statistics indicating the crowded conditions of UK prisons (Ministry of Justice, 2018) suggest that autistic offenders may be required to be around more prisoners (e.g., sharing a cell). The reduced enjoyment of the company of others and reduced likelihood to work to maintain relationships may make this experience more difficult for not only the autistic offender but also the other offenders and prison staff.

Whilst Chapters Two and Three found relatively few variables to differ between autistic offenders and the other three groups, there are three ways to interpret the lack of differences between autistic offenders and autistic non-offenders. The first is that maybe autistic offenders are not a significantly different group in terms of the factors measured in Chapters Two and Three, the second is that the measures are not sensitive enough to differentiate the groups, and the final consideration is that the variables measured may not have been the right ones to predict autistic offending status. Chapter Four aimed to address the lack of significant differences by asking participants why *they* thought that they engaged in the offending. The findings from Chapter Four with autistic sexual offenders indicated five main themes or reasons for offending: (1) social deficits; (2) misunderstanding; (3) sex and relationship deficits; (4) inadequate control; and (5) disequilibrium. The most commonly

occurring subthemes were: (1) social skills difficulties; (2) lack of perspective; (3) misunderstanding the seriousness of their behaviours; and (4) a lack of appropriate relationships. Linking back to the prominent theories of autism, ToM difficulties and weak central coherence (WCC) appear to underpin the autistic sexual offenders' reasons for offending.

ToM refers to the ability of an individual to ascribe mental states to other people to understand how they are feeling (Baron-Cohen, 2008; Premack & Woodruff, 1978). ToM is required to understanding what someone is thinking or feeling in order to understand predict their behaviour (Baron-Cohen, 2008). Although no significant differences were identified between autistic offenders and both TD groups (offender; non-offender) or autistic non-offenders on the Strange Stories assessment of ToM used in Chapter Three, the self-reported motivations of autistic sexual offenders reported in Chapter Four indicated ToM deficits may have influenced their offending. They demonstrated an inability to understand how the other person was feeling at the time of the offence. Whilst the studies presented in this thesis and previous research have not empirically found significant differences between autistic offenders and comparison groups, many of the participant quotes coupled with anecdotal stories from CJS professionals continue to suggest impairments in ToM. An example anecdotal story was that an autistic prisoner was asked to carry a book back to the wing by fellow prisoner which was later found to contain drugs. The autistic prisoner had no history of drug offences or drug use whereas the other prisoner did. The autistic prisoner did not question the intentions of the other prisoner which appears to be indicative of ToM deficits and associated vulnerability as described in previous literature (Archer & Hurley, 2013; Blackburn & Howlin, 2004; Brewer & Young, 2015; Murrie, Warren, Kristiansson & Dietz, 2002; Yang et al., 2017). Great variability in ToM measures has been found throughout the autistic adult literature. On the Strange Stories test of ToM research whilst much research

reports autistic adults to perform worse than TD adults (Adler, Nadler, Eviatar, & Shamay-Tsoory, 2010; Crane, Goddard, & Pring, 2013; David et al., 2008; Joliffe & Baron-Cohen, 1999; Kirsten, Rossman, & Sodian, 2014; Podreño, Pousa, Navarro, Pàmias, & Obiols, 2017; Rogers, Dziobek, Hassanstab, Wolf, & Convit, 2007), some research found no significant differences in performance between autistic and TD individuals (Couture et al., 2010; Murray et al., 2017; Schneider, Slaughter, Bayliss, & Dux, 2013; Schuwerk, Vuori, & Sodian, 2015; Spek et al., 2010; Wilson et al., 2014). It has been suggested that these differences in findings may be due to the ability of some autistic individuals to hack out the correct answer to a problem on paper however these individuals may still struggle with the same scenario if experienced in real life (Frith, 2004). In response to this, more dynamic methods have been designed which require participants to watch video clips based in part on Happé's (1994) Strange Stories ToM measure. Two studies to date have used this measure and both have successfully differentiated between ASD and TD adults (Brewer, Young, & Barnet, 2017; Murray et al., 2017) although only Brewer et al. (2017) included a time limit in the measure to try to prevent individuals hacking out the answer. Future autistic offender research should try to disentangle the role of ToM deficits in autistic offenders through the use of dynamic tests of ToM such as the Adult Theory of Mind (A-ToM; Brewer et al., 2017) which appear to be more sensitive to differences in ToM. It may also be beneficial to develop ToM video(s) directly related to offending behaviours to assess whether autistic offenders have general ToM deficits or whether the deficits they have are more offence specific.

WCC refers to a processing style focussed more on local processing than global processing (Frith, 1989) which is frequently reported in non-offending autistic adults (Barnes & Baron-Cohen, 2012; Booth & Happé, 2016; Jolliffe & Baron-Cohen, 1997; 1999; 2001a; 2001b; 2001c; Kätsyri, Saalasti, Tiippana, von Wendt, & Sams, 2008; Shah & Frith, 1993). Although Maule, Stanworth, Pellicano, and Franklin (2017) found superior local processing

without a global processing deficit, this was not supported by the sexual offender interview data. Whilst not empirically tested so caution must be drawn, a number of offenders hinted at a greater focus on local processing with global processing deficits as indicated by statements such as: *"I didn't really look at the bigger picture of things"* [Participant 2] and some participants identified post offence that they should have adopted a more global perspective, *"I should have took two steps back to take a look at everything"* [Participant 3]. Previous research has suggested a role of WCC in offending (Higham, Pirachi, & Crocombe, 2016) but to date no research has empirically tested this claim. The findings of Higham et al. (2016) combined with the sexual offender interview data suggest that WCC may be a risk factor for autistic offending. With this in mind, future research should investigate WCC within an offender population. In addition to measures previously used in research (e.g., the embedded figures test; Witkin, Oltman, Raskin, & Karp, 1971) it would be beneficial to design a specific WCC test related to offending behaviours.

Often the use of the internet can lead to offenders feeling distanced from their victims and not seeing the global picture. The importance of understanding the internet is key to preventing offending. Within the sexual offender sample, the internet appeared problematic for two non-mutually exclusive sub groups of the offenders: (1) those who struggled socially; and (2) those who did not understand the laws governing the internet. Those who struggled socially made comments including: *"not being very good socially…with people"* [participant 1]; *"I didn't really know how to communicate with people"* [participant 2]; and "*not having a 'normal' relationship outside [of the internet]* [participant 4]. This subset of the sexual offender sample inferred that the internet was a way for them to access friendships and relationships in a manner much more accessible than in the real world. This appears to link to previous literature indicating that the internet helps to facilitate communication, friendships and relationships for autistic individuals (Benford & Standen, 2009; Carter et al., 2012;

Gillespie-Lynch et al., 2014; Van der Aa et al., 2016). For those who did not understand the laws governing the internet, there was a lack of understanding about the laws around online behaviour (i.e., engaging in sexual exchanges with under 16-year-old children) and also misbelief as to what was available online: *"I typed Babylon 5 in that and then I was astonished to see all names coming up of indecents and stuff like that. So I said this can't be real so I did the mistake of not believing it is real and I downloaded the mass file, went to work, came back, had a look at one, realised it were real"* [Participant 3]. Furthermore, there was a misunderstanding of the role of internet search engines: *"Google being a something that is a company that only has information given to them to advertise and stuff like that. Surely they wouldn't put anything illegal on"* [Participant 3] and the police: "*I was really surprised that that is available online. I'm surprised that the police haven't you know, they've managed to hunt bin laden down in the middle of nowhere what, how have they not blocked all child abuse photos and images that you can download. I don't understand. And if they are arresting you for it then they know it's there"* [Participant 9].

The internet appears to be a source of confusion for the cyber-dependent offenders also, with a lack of understanding reported by all offenders. The misunderstandings for this group were in relation to the consequences, impact and seriousness of their online behaviours. The cyber-dependent offenders also highlighted a lack of specific education regarding the laws around cyber behaviours. 17% of the cyber-skilled individuals had been approached to offend but had desisted providing reasons which often mirrored the offenders. This highlights the importance of obtaining motivations from both groups (those who offend; those who desist despite being asked) to help inform interventions. For example, where the offenders reported a lack of understanding, anonymity and diminished risk perception, the non-offenders reported reasons for desisting from offending including, being aware of the consequences and the proposed behaviour being too risky. The qualitative data from the both

the sexual offenders and cyber-dependent offenders suggest that greater education is required surrounding the internet.

Finally, the only significant predictor of cyber-dependent deviancy was advanced digital skills which indicates that contrary to previous suggestions (e.g., National Crime Agency, 2017), autism is not a predictor of cyber-dependent offending. The finding that, autistic traits and explicit social cognition were positively associated with advanced digital skills highlights the need for ASD friendly recruitment strategies and working environments which could not only help to reduce the number of unfilled cyber jobs but also help to increase the number of autistic individuals in paid employment.

6.2. Implications for practice

The implications which arise out of this thesis bear significance for both the day-to-day management of offenders (e.g., mental health, social vulnerability, RRIBs, social motivation) and also for the prevention of initial or re-offending (e.g., education programmes around the laws governing the internet).

6.2.1. Day-to-day management

Regarding day-to-day management, the increased prevalence of mental health diagnoses in the autistic offenders compared to TD offenders is something that should be carefully monitored. If an offender discloses an ASD diagnosis or if an offender has high autistic traits, they should be carefully screened for mental health difficulties before being monitored and offered appropriate treatment for any difficulties that they may have. Furthermore, the CJS should ensure that all staff receive mental health training regularly to help identify, monitor and help offenders who are experiencing mental health distress. Whilst there are training courses available, the National Audit Office (2017) found that 40% of

prisons in England and Wales did not provide mental health refresher training to staff which may impact upon abilities to identify or intervene at times of mental health distress.

Secondly, increased social vulnerability may lead to autistic offenders being manipulated or coerced by others due to the inability to detect or avoid harmful interactions (Pinsker et al., 2006). Currently the social vulnerability scale includes some items which may not be so applicable within the CJS (e.g., how often have to been tricked into paying another person's bill or share of a bill (e.g., in a restaurant or shop) and there are no questions directly related to offending behaviours. Future research should develop and evaluate a more forensic based social vulnerability assessment to enable effective identification and subsequent management of social vulnerability risk in forensic settings.

Furthermore, social vulnerability coupled with significantly higher occurrences of restricted interests and repetitive behaviours (RRBs) in the autistic groups (offenders; non-offenders) compared to the TD groups (offenders; non-offenders) has implications for day-to-day management which needs careful consideration. These vulnerabilities may increase the risk for manipulation of autistic individuals into criminal behaviours. For example, if the restricted interest of an individual has criminogenic potential (e.g., chemistry of bomb making, hacking) then this may lead to an individual being manipulated into offending due to an inability to detect potential harmful interpersonal interactions and a desire to engage in their restricted interest. Restricted interests and repetitive behaviours are one of the diagnostic features of ASD (World Health Organisation, 2018) and previous research found that violent autistic offenders were significantly more likely than autistic non-offenders to report a violent interest (e.g., weapons) (Woodbury-Smith et al., 2010). The nature of the relationship between the interest and the offending was not very clear with only one offenders' interest directly related to his offending and for approximately 70% of the autistic offenders no relationship between content or intensity of the interest and illegal behaviour could be

identified (Woodbury-Smith et al., 2010). Future research should look at not only extending understanding to other crime types (i.e., not just violent offenders) but also look at the interaction between social vulnerability and facilitation of restricted interests by others for criminogenic gain. Day-to-day monitoring and management of any potentially criminogenic restricted interests should be maintained throughout the CJS to help prevent both manipulation and future offending.

Aside from the increased social vulnerability and RRBs, both autistic groups had diminished social motivation, a characteristic associated with reduced enjoyment of the company of others and being less likely to work to maintain relationships (Chevalier et al., 2012). Previous research suggests that autistic offenders experience of prison was acceptable when interactions were limited to specially selected prisoners (e.g., quiet, calm or other autistic prisoners) (Helverschou et al., 2018), however current statistics indicate crowded conditions of UK prisons (Ministry of Justice, 2018) suggesting that autistic offenders may be required to be around more prisoners (e.g., sharing a cell, more prisoners per wing) which has a number of implications. Firstly, increased numbers of interactions would increase the likelihood ASD social vulnerability being exploited or it may lead to difficulties in managing the social environment for the autistic offender. The requirement to be around increased numbers of prisoners but having a lack of enjoyment being around others may cause distress for the autistic offender. Alternatively, there may be increased altercations between autistic prisoners and TD prisoners due to the lack of interest to work to maintain relationships characteristic of diminished social motivation. This would require careful management by CJS staff to prevent injury. An understanding of the social capabilities of the autistic offender would help to manage this. Where possible staff should work with the autistic offenders to establish the safest environment for the offender (e.g., smaller wing, wing with different make up of prisoners). Future research should investigate this further by conducting

interviews specifically investigating the social environment and the preferences of autistic offenders coupled with quantitative social motivation measures.

6.2.2. Prevention of offending and re-offending

Regarding preventative implications, monitoring and education appear key. Autistic offenders were found to experience more family and childhood adversity events than TD non-offenders. Whilst this did not differentiate the autistic groups or the offender groups, it does suggest that this is something that could be monitored within educational settings. If an autistic young person is experiencing family and childhood adversity events (e.g., parental difficulties with drugs, alcohol or mental health problems or if the young person is being bullied by others) then additional support could be given to try to help reduce the stress of the events. Research into mentoring programmes for TD youth at risk of offending indicate positive outcomes (i.e., reduction in problem behaviours) (Tolan et al., 2013; Weiler et al., 2015) suggesting that future research should look into the adaptation of such programmes for autistic youth also. Research should ask autistic offenders what might have prevented them from offending to incorporate this into interventions to prevent initial or re-offending. Then if appropriate to do so, these strategies could then be offered to autistic individuals demonstrating risk factors for offending to help prevent offending behaviours.

Future research to identify the reasons for autistic offending across different offence types is important to inform interventions. Both the Risk-Need-Responsivity (RNR) (Andrews, Bonte, & Hoge, 1990) and the Good Lives Model (GLM) (Ward & Stewart, 2003) of offender rehabilitation are commonly used within the CJS and a greater understanding of the motivations for offending would be helpful in informing both models. The foci of the models vary with the RNR focussing on understanding offending and risk factors with the goal to reduce or eliminate these to prevent offending whereas the GLM adopts a strengths based and aims to provide the offender with the capabilities and skills to achieve their desired

goals in an acceptable way (e.g., legal, personally rewarding). Regardless of the rehabilitation model used, understanding what the offender was trying to achieve from the offending (i.e., their motivations) will help to inform interventions.

Furthermore, education is key with many of the autistic sexual offenders stating that now that they knew that their behaviours were wrong they wouldn't do it again. There are three main directions that future research could go. The first being to identify whether the same motivations are reported by individuals engaging in sexually inappropriate behaviours but have not been involved with the CJS regarding these. This research would help to inform pre-offending interventions to help prevent autistic individuals ended up in the CJS as literature identified that autistic individuals can have difficulties navigating, understanding and coping with the CJS (Allen et al., 2008; Helverschou et al., 2015; Helverschou, Steindal, Nøttestad, & Howlin, 2018; Newman, Cashin, & Waters, 2015; Patterson, 2008). The second is to design and evaluate sex and relationship education packages which cater to the needs of autistic individuals to help address the misunderstandings including both the law and the internet. The third direction is to compare the motivations of autistic sex offenders to other types of autistic offenders (e.g., violent, non-sexual).

Comparison of the sexual offenders to cyber-dependent offenders can only be done very cautiously given that only one of the cyber-dependent offenders had a formal diagnosis of ASD. His main motivation for offending was morals (i.e., he found a vulnerability in a company's system, told the company, but when they refused to acknowledge or fix the vulnerability he published the entire customer database which had been sensitised to remove identifiable customer data). Whilst acknowledging this was only one individual, his motivations draw comparison to offenders who are not cyber-dependent. For example, one offender downloaded child pornography due to a misbelief that this was available online, once realising the content of what he had downloaded contacted the National Society for the

Prevention of Cruelty to Children (NSPCC) to report what he had found, again demonstrating a degree of morals as once he realised what he had found he tried to communicate this to a relevant organisation.

When looking at the reasons for engaging in cyber dependent offending, these frequently mirrored the reasons for desisting from offending. For example, where the offenders reported a lack of understanding, anonymity and diminished risk perception, the non-offenders reported reasons for desisting from offending including, being aware of the consequences and the proposed behaviour being too risky. Both cyber-dependent and sexual offenders typically started offending at a young age which highlights the importance of a school-based intervention to help prevent offending. For example, computer coding is now on the primary school curriculum but not necessarily the law surrounding this.

A lack of understanding was a commonly occurring theme throughout the studies reported in this thesis as a reason for offending (i.e., sexual offending; cyber-dependent offending) and something which, with the right packages could be addressed. For example, previous literature has reported that current sex education packages are not appropriate for autistic individuals and that there is a need to tailor such packages to the needs of autistic individuals (Hannah & Stagg, 2016). One possible option would be to adapt the PEERS® programme, a social skills programme (Semel Institute, 2018). There are three manuals available (pre-school, adolescent and young adult) however only the young adult programme includes information about dating etiquette and developing romantic relationships, which may also be required for adolescents given that many of the sexual offenders started offending as adolescents. What is missing from both of these manuals is information about the use of the internet and the associated consequences which future research should look to develop and pilot.

The inclusion of cyber skills on the National Curriculum for children as young as five combined with the finding that over a third of 15-year olds in the UK use the internet for more than six hours outside of school on a weekend day (Frith, 2017) highlights the need for education on how an individual can practise and use their cyber skills legally. Information about the laws governing the use of the internet need to be taught to young people because this is currently missing. PSHE classes in school cover cyber bullying and maintaining confidentiality through cyber security protocols and information (PSHE Association, 2017) and the National Curriculum for computing programmes of study refer to aims of responsibility and respectfulness related to protecting privacy and identity (Department for Education, 2013) however nothing is taught about cyber laws (e.g., the Computer Misuse Act 1990). The Cyber Security Challenge UK in collaboration with the National Crime Agency have attempted to address this deficit by developing a lesson plan which is freely available. The lesson plan has three main aims: (1) to increase vocabulary around cyber security; (2) provide information about what a cybercrime is; (3) introduce the Computer Misuse Act and the consequences of criminal behaviour (Cyber Security Challenge, nd). Future research should evaluate the effectiveness of this lesson plan and make amendments in line with findings if required.

The data from Chapter Five indicated that whilst ASD was not a significant predictor of cyber-deviant behaviour, ASD was significantly positively correlated with advanced digital skills. There are two main groups who could benefit from this finding: (1) the cyber workforce and economy; and (2) cyber skilled individuals with high autistic traits. Employing autistic individuals or those with high autistic traits could help to reduce the deficit in filled cyber jobs (Morgan, 2018). Secondly, it is reported that only 46% of autistic individuals are employed (Howlin & Moss, 2012) and as identified earlier within this thesis, the TD literature has identified that not having a job increases the risk of offending (Aaltonen,

Kivivuori & Martikainen, 2011; Fergusson, McCleod, & Horwood, 2014; Kleck & Jackson, 2016; Verbruggen et al., 2012). Whilst no literature investigates the role of unemployment in offending for autistic individuals, research indicates that autistic individuals were more likely to have contact with the police if they did not have a structured day (Tint et al., 2017). Whilst possibly a contentious point to make, the reported increased prevalence of ASD within the CJS (Enyati Grann, Lubbe, & Fazel, 2008; Fazio, Pietz, & Denney, 2012; Hare, Gould, Mills, & Wing, 1999; Kumagami & Matsuura, 2009; National Autistic Society, 2017; Robinson et al., 2012; Scragg & Shah, 1994; Siponmaa, Kristiansson, Jonson, Nydén, and Gillberg, 2001; Soderstrom, Sjodin, Carlstedt, & Forsman, 2004; Soderstrom, Nilsson, Sjodin, Carlstedt, & Forsman, 2005) may partly be explained by the lack of employment and subsequent structure for autistic individuals however further research is needed to investigate this.

Autistic individuals have many positive inherent traits including a strong sense of morality, trustworthiness and loyalty which when recognised and nurtured by an employer would enable individuals to reach their full potential (de Schipper et al., 2016). Whilst research into employment strategies beneficial for autistic individuals or those with higher autistic traits are still in their infancy, employers should ensure that they adapt recruitment strategies and workplace environments in line with what is currently known. This will help to successfully recruit and maintain an excellent group of employees who would otherwise be unemployed. Currently, research into specific factors which improve employment outcomes is still somewhat lacking (Hedley et al., 2017). Nevertheless, some of the currently suggested recommendations for employers include: providing an interviewee with a copy of interview questions prior to interview; offering a job trial instead of a skills-based interview; ensuring jobs match skills *and* difficulties; clear communication in the workplace; ensuring tasks are broken down; explaining the workplace culture; educating employers and employees about ASD involving autistic individuals at each stage (Müller, Schuler, Burton, & Yates, 2003;

Sarrett, 2017; Scott et al., 2015). In addition, research has started to develop tools to help employers to improve the workplace environment to help meet the needs of autistic employees. The first tool which has been trialled as an RCT under real life conditions is the IEST™ which aims to assist employers in the employees (Scott, Falkmer, & Girdler, 2018). Although this tool found no significant difference in employer self-efficacy between employers who used the tool and those who did not, preliminary evidence suggested increased confidence and knowledge in modifying the work environment (Scott et al., 2018). Future research should also evaluate the effect of interventions such as the IEST ™ on autistic employees.

6.3. Future research

Although the research presented and discussed within this thesis answered a number of questions, many more were raised, highlighting that further research is required to further progress understanding of offending across the spectrum. Some of the proposed future research includes extensions of studies within this thesis but with larger samples. For example, future research should collect OFQ data from a larger sample of matched participants. The sample should be large enough to provide good statistical properties (e.g., power) for running multinomial logistic regressions to identify whether specific questions predict offending within each of the groups to identify whether these differ between autistic and TD offenders. In addition, the preliminary data presented in Chapter Five should also be expanded upon to include more data from cyber-dependent offenders. This information can then be used to inform offending and re-offending prevention interventions.

Largely the areas of future research can be divided in three main categories: (1) characteristics associated with ASD; (2) self-reported reasons for offending; and (3) education and interventions.

6.3.1. Characteristics associated with ASD

Some of the future research ideas involve developing and evaluating existing tools with the addition of more specific offender elements (i.e., ToM, social vulnerability). The social vulnerability measure should be developed to include questions directly related to criminal behaviours (e.g., how often have you agreed to engage in criminal behaviours such as theft or burglary at the request of another person; how often have you found yourself in trouble with the CJS after following the request of another person; how often have you not realised the intention of another person which has resulted in you getting into trouble with the CJS?). Future research should also adapt the A-ToM (Brewer et al., 2017) to include some video scenarios which are specific to offending to help identify whether: (a) autistic offenders have general and offending-specific ToM deficits; (b) do not have general ToM deficits but do have offending-specific ToM deficits; or (c) do not have any ToM deficits.

Alternatively, some research may benefit from modelling methods used in other areas. For example, whilst no significant effect of group was observed for moral reasoning, it may be useful to develop a measure which requires participants to watch a short video instead of reading a scenario and imposing a time limit for answering the moral reasoning questions (i.e., similar to the A-ToM). This method has been found to be helpful in differentiating autistic and TD individuals on ToM. The videos may also help to be more inclusive of the offending population given the lower literacy levels reported in prisoners (Creese, 2015; Prison Reform Trust, 2017).

It is further proposed that future research investigating social motivation should use both interview and quantitative social motivation measures. Asking autistic offenders about their social experience within the CJS (e.g., prison) will improve understanding around social motivation and other factors that may make the experience of the CJS difficult (e.g., does the offender have many arguments with cell mates due to their lack of interest in working to

maintain relationships?). This research may also be complimented by interviewing CJS staff that know the offender to see whether there are any discrepancies in reports. The data from the interviews can then be compared to the quantitative social motivation scores to see whether scores may predict the degree of difficulty experienced.

Future research should aim to understand the relationships between RRBs and offending. As identified in previous research RRBs can be related to the offending however the nature of this relationship is not clear. As highlighted within this thesis it can be hypothesised that if an individual has an RRB which has criminogenic potential (e.g., hacking) coupled with the increased social vulnerability found in autistic offenders, this could increase the risk of offending. Future research should look into the relationship between RRBs and offending as well as trying to unpick the hypothesised link between social vulnerability and RRBs. This would best be approached through a mixed methods design of using quantitative assessments (e.g., Social Vulnerability Scale, Pinsker et al., 2006; Social motivation subscale of the social responsivity scale; Constantino & Gruber, 2012) coupled with semi-structured interviews to obtain improve understanding of the role of RRBs in offending.

The final proposed future research project relating to autistic traits includes the suggested WCC indicated by the sexual offenders. Although WCC was not explicitly measured, offenders made comments during the interview indicative of WCC highlighting that this is something that should be measured in future research. To date no research has investigated this in autistic offenders despite indications that this may help to explain offending behaviours (Higham et al., 2016). Future research should empirically test WCC in a wide range of autistic offenders to identify whether this is something which influences offending behaviours. Comparisons between offence types could also be made to help inform and tailor interventions. Finally, similarly to both the ToM and social vulnerability

suggestions, it could be helpful to develop an offence-specific WCC measure to see whether the offenders differ on general WCC, offence-specific WCC or do not differ at all compared to comparison groups (i.e., autistic non-offenders; TD offenders; TD non-offenders).

6.3.2. Self-reported reasons for offending

It would also be fruitful for future research to conduct interviews with autistic offenders that have committed a variety of offences (i.e., not just sexual) to understand the motivations across offence types. In addition, interviewing both offenders and non-offenders will help to identify not only why the offenders offended but also to understand why individuals choose not to offend. This approach offered valuable insight within the cyber-dependent deviancy research of this thesis as it provides understanding of which elements education packages should focus upon to help prevent offending (e.g., awareness of the consequences). The interviews should also ask whether the offenders feel that there is anything that would have prevented them from offending.

Chapter Three found that autistic offenders typically engaged in lone offending however previously identified reasons for choice of lone or co-offending (e.g., age, crime type) did not differ between the offender groups (ASD, TD) suggesting that further qualitative research would be helpful to understand why autistic individuals engage in lone or co-offending. This might best be approached using interview methods given that the TD literature does not explain the decision to offend alone or with others by autistic offenders and no autistic offender literature explains this finding either.

6.3.3. Education and interventions

Following on from the research findings of this thesis, future research should design or adapt a sex and relationships education package for autistic individuals which also

includes information about the laws surrounding the internet to help prevent offending or re-offending. This is particularly pertinent due to the attraction of internet facilitated communication for autistic individuals (Benford & Standen, 2009; Carter et al., 2012; Gillespie-Lynch et al., 2014; Van der Aa et al., 2016) coupled with the reported ineffectiveness of current sex and relationships education packages for autistic individuals (Hannah & Stagg, 2016).

Furthermore, there is also a need for research to design and evaluate a cyber-education package to help address the misunderstandings that lead to the cyber-dependent deviancy and offending. The importance of this is highlighted by the omnipresent teaching of cyber skills but lack of information about the law (Department for Education, 2013; PSHE Association, 2017). Table one provides an overview of all of the findings, implications and ideas for future research suggested within this discussion chapter.

Table 1. Overview of empirical thesis findings, practical implications and future research

Chapter Two findings overview:	Practical Implications	Future research
Offending factors questionnaire (OFQ) total • Autistic offenders scored higher than both autistic non-offenders and TD non-offenders.	• When assessing risk, a combination of factors must be considered and included.	• Whilst only OFQ total and BC significantly differed between autistic offenders and autistic non-offenders one must remember that risk factors do not occur in isolation and often co-occur identifying the need to understand the relationship between variables. Thus, future research should collect OFQ data from a larger sample with good statistical power to enable multinomial logistic regression to be run to identify whether specific questions predict offending. • In order to offer appropriate support to help prevent offending, future research should conduct research with both autistic offenders and autistic non-offenders to help identify what would have prevented their offending (i.e., offenders) or what does prevent them from offending (i.e., non-offenders).
Mental health (MH) • Autistic offenders reported more MH difficulties and input from services than TD offenders and TD non-offenders. • Autistic non-offenders reported more MH difficulties and input from services than TD non-offenders.	• Autistic offenders should be assessed carefully and monitored for MH difficulties and distress.	
Substance use (SU) • Autistic non-offenders reported significantly less substance use than TD offenders.	• Nil.	
Family & childhood adversity (FCA) • Autistic offenders experienced greater FCA than TD non-offenders.	• If an autistic person is experiencing FCA or has done then they should be closely monitored and offered appropriate support (e.g., from schools, appropriate family) to help prevent offending.	
Behavioural conduct (BC) • Autistic offenders reported more BC issues than autistic non-offenders and TD non-offenders. • TD offenders reported more BC issues than TD non-offenders.	• Whilst autistic offenders often engage in serious offences without the catalogue of minor offences preceding this, behavioural conduct factors such as those measured here may help to identify those at risk of offending (e.g., physical/verbal aggression; over activity).	
Moral reasoning • No significant main effect of group.	• Nil.	

Chapter Three findings overview	Practical Implications	Future research
Social vulnerability • Autistic offenders more socially vulnerable than TD non-offenders. • Autistic non-offenders more socially vulnerable than TD non-offenders.	• Autistic offenders may have difficulty detecting or avoiding harmful interactions. Within a forensic environment this may lead to the individuals being coerced into further criminal behaviours by others. Social vulnerability should be assessed and actions taken to help reduce risk (e.g., moved to a wing where the individual is less vulnerable to manipulation).	• Future research should develop and evaluate a more forensic based social vulnerability assessment to enable effective identification and subsequent management of risk in forensic settings.
Compliance • Autistic non-offenders significantly more compliant than TD non-offenders.	• Within interview settings it would be important to ensure that appropriate measures are taken (e.g., presence of an appropriate adult) to prevent increased compliance interfering with evidence collection.	• Future research should test the compliance of autistic offenders using behavioural measures compliance (see Chandler et al., in press).
Theory of mind • No significant main effect of group.	• Nil.	• Future research should investigate ToM in autistic offenders with a dynamic measure (see Brewer et al., 2017) as well as including an offending specific subset of ToM videos to help identify whether autistic offenders: (a) have general and offending specific ToM deficits; (b) don't have general ToM deficits but do have offending specific ToM deficits; or (c) don't have any ToM deficits.
Social motivation • Autistic offenders significantly less socially motivated than TD non-offenders. • Autistic non-offenders significantly less socially motivated than TD non-offenders.	• Reduced social motivation may result in the frequently crowded prison environment being more distressing for the autistic offender than a TD offender. When the prison experience was found to be 'okay' interactions with other prisoners were limited (e.g., specially selected calm, quiet, or	• The practical implications suggested here are based on understanding ASD. No previous research had investigated SM within forensic environments. Future research should conduct interviews with autistic offenders, in

	autistic prisoners; Helverschou et al., 2018). Additionally, if required to share a cell with another individual, this may be difficult for the individual. In practice and where able to do, staff should liaise with the autistic offender to identify what their social preferences are and how the situation can be adapted (e.g., single cell, probation appointments at quieter times of the day).	combination with quantitative SM measures, to investigate the implications perceived by autistic offenders as to the role of social motivation within forensic environments.
Restricted interests & repetitive behaviours (RRBs) • Autistic offenders reported more RRBs than TD offenders and TD non-offenders. • Autistic non-offenders reported more RRBs than the TD offenders and TD non-offenders.	• RRBs may lead to autistic individuals being less likely to engage with others outside of their interest suggesting they may be less likely to engage with other offenders due to a lack of interest outside of their restricted area (Cho et al., 2017; Turner-Brown et al., 2011), however if the nature of their interest has criminogenic potential (e.g., chemistry of bomb-making; or hacking), coupled with the increased social vulnerability this may lead to manipulation of the autistic offender and future offending.	• Previous research with violent autistic offenders suggests that only 19% of RRBs related to offending behaviours (Woodbury-Smith et al., 2010) suggesting other factors were influencing behaviour also. Future research should investigate the role of RRBs in additional types of offending also.
Lone and co-offending • Autistic offenders were more likely to engage in lone offending than co-offending. • None of the variables measured (i.e., social vulnerability, compliance, ToM, social motivation, restricted interests and repetitive behaviours) predicted lone or co-offending.	• In practice, interventions should reflect the nature of the offending (i.e., the role of the individual rather than the role of the group), however caution should be exercised given the increased social vulnerability which may have prevented the autistic offenders from detecting the harmful interactions with others which may have preceded the offending behaviours.	• Future research should aim to understand why autistic individuals engage in lone or co-offending given previously identified reasons (e.g., age, crime type) did not differ between the offender groups (ASD, TD).

Chapter Four findings overview:	**Practical Implications**	**Future research**
Five main motivations for sexual offending emerged with most offenders referring to more than one theme: 1. Social deficits	• Participants typically referred to more than one theme which highlighted the need for offender	• Future research should design or adapt a sex and relationships education package for autistic individuals which also includes information about the

2. Misunderstanding 3. Sex and relationship deficits 4. Inadequate control 5. Disequilibrium The most frequently reported sub-themes were: • Social skills difficulties • Lack of perspective • Misunderstanding the seriousness of their behaviours • Lack of appropriate relationships	assessment and intervention to consider a range of factors.	laws surrounding the internet to help prevent offending or re-offending. • Future research should conduct the same or similar interview with individuals who have committed different crime types (e.g., violent) as well as those who engage in sexually inappropriate behaviour but are not within the CJS. • Future research should ask the offenders if there is anything that they believe would have prevented them from committing the offence. • Future research should assess WCC in autistic offenders using existing measures but also design and evaluate an offending specific measure of WCC.
Chapter Five findings overview:	**Practical Implications**	**Future research**
• Only advanced digital skills predicted cyber deviancy. • Autistic traits and explicit social cognition were significantly positively correlated with advanced digital skills. • 17% of non-offenders had been approached to offend and desisted. Seven main reasons for desisting were reported: 1. Sticking to morals 2. Proposed behaviour being too risky 3. Being afraid of the consequences 4. Not wanting to 5. Wanting to adhere to the law	• Autistic traits did not predict cyber deviancy however were significantly positively correlated with advanced digital skills suggesting that cyber professionals are likely to possess higher autistic traits. This has practical implications in the workplace for example, ensuring recruitment strategies and methods along with working environments are ASD friendly. This will hopefully help to fill the cyber job deficit. • Furthermore, work should be done with cyber companies (e.g., gaming vendors) to help reduce the mixed messages that are often sent to young people (e.g., gaming modifications often encouraged by	• Future research should increase the size of the cyber-dependent offender sample to further develop the data findings here. • There is a need for research to design and evaluate a cyber-education package to help address the misunderstandings that lead to the offending. • Future research should look to explain why although cyber deviancy rates were similar between males and females, no cyber dependent offenders

6. Behaviour being too complicated 7. Price being too low • Preliminary cyber-dependent offender data suggests offenders differ to non-offending cyber skilled individuals on: 1. Demographic variables (i.e., younger in age, predominantly male, lower non-verbal IQ) 2. Psychological variables (i.e., lower autistic traits, poorer explicit social cognition) 3. Digital skills (i.e., more advanced digital skills) • Seven main themes for cyber-dependent offending motivation emerged: 1. Lack of understanding 2. Entertainment 3. Social motivation 4. Experience and career 5. Anonymity and risk perception 6. Life events 7. Morals	vendors despite technically being breaches of copyright).	were known to the National Crime Agency (National Crime Agency, 2017).

6.4. Limitations

Whilst the studies reported within this thesis overcame a number of the limitations of previous research (e.g., small samples, lack of comparison groups) there are still some limitations that need to be discussed. The main limitation is that all of the data were collected post offending and frequently after the offender had spent many years within the CJS and often after receiving interventions. This could help to explain the lack of differences reported on numerous variables. For example, often interventions focus on developing understanding of how others may feel or developing moral reasoning which may have resulted in improved theory of mind and moral reasoning compared to when the offenders engaged in their offending behaviours.

Additionally, when interviewing the individuals about their reasons for offending they might have provided justifications for their offending or a more socially acceptable explanation of their behaviours instead of what their true motivations were at the time of offending. Offenders may also have discussed their offending behaviours with professionals since offending resulting in a different narrative than would have been expressed prior to this. Alternatively, previous research suggests that autistic individuals remember fewer specific instances from their past which may impact upon their meaning making from experiences (Crane, Goddard, & Pring, 2010). One possible way to assess and overcome these potential issues would be through longitudinal research whereby the individual's memory of the offence and their reasons for offending are recorded across a series of time points to monitor any changes. If time is found to change offenders' recall of their offending motivation, future research should aim to interview autistic offenders as soon as possible after conviction, however the practicalities of this would have to be assessed.

Another possible confounding variable concerns the identification of offenders. For example, were the offenders included within this biased (e.g., not all autistic offenders invited

due to concerns over the safety of the researcher). This could have led to biased results. To the researcher's knowledge this group of individuals was small with only two individuals known to have been excluded due to researcher safety concerns. Additionally, it was not possible due to ethical approval and establishment guidelines for the researcher to access the notes of the offenders to confirm ASD diagnosis however CJS staff did confirm that participants had received a diagnosis from a professional. Furthermore, it could be possible that some autistic individuals may have inadvertently been excluded from the study due to the CJS being unaware of their ASD diagnosis. A further limitation related to the sample is that the sensitive nature of the research may also have impacted upon the included sample. For example, there could be a self-selection bias which inadvertantly excluded individuals because they did not feel comfortable engaging with research of this nature. A final limitation related to the sample is that all the offenders included within this thesis were convicted of offences. It is possible that the findings of this thesis may not be generalisable to individuals who are engaging in offending behaviours but who are currently unknown to the CJS. This could have many implications especially for the designing of offending prevention interventions.

A further methodological limitation that needs to be acknowledged is the use of self-report due to the conflicting findings preventing firm conclusions being drawn about whether autistic individuals can effectively use self-report tools. Some previous research suggests that individuals can successfully complete self-report tasks (e.g., Hesselmark, Eriksson, Westerlund, & Bejerot, 2015) whereas others suggest that individuals have difficulty with a number of self-report elements including quantifying experience, expressing themselves and under-reporting of difficulties (Findon et al., 2016; Hesselmark, Plenty, & Bejerot, 2013; Mazefsky, Kao, & Oswald, 2011; Shalom et al., 2006). Impairments in self-awareness and insight may help to explain the mixed findings (Huang et al., 2017). Thus, it may be helpful

for future research to obtain the informaiton both from the participant themselves but also from someone who knows the individual well to compare findings. Aside from providing a better insight into the area being researched, it will also help to improve understanding of the abilities of individuals with ASD to complete self-report tools.

Additionally, the use of measures which have not been validated for use with autistic individuals is another limitation. Whilst the measures included within this study were carefully chosen to ensure the measures should not have been problematic for autistic individuals to complete, without validation with ASD samples it is possible that there could be implications for measurements (e.g., reduced sensitivity). In future, research should seek to validate a greater number of measures for use with autistic populations to enable firm conclusions to be drawn from research.

A further limitation is that although the measures designed for this research (e.g., lone/co-offending questionnaire, interview schedules) were designed by those with extensive ASD knowledge and experience, autistic individuals themselves were not involved in the development. Autistic research suggests that involvement of autistic individuals at every stage of the research process leads to better translation into practise and associated better outcomes for autistic individuals (Fletcher-Watson et al., 2018). In future, research should not only involve autistic individuals in the entire research process but should also conduct validation studies to improve confidence in findings and ability to generalise findings.

This research included only male offenders and although justifications for this were explained within the introduction (i.e., 95% of prison population male, 3:1 male to female ratio of ASD diagnosis; Loomes, Hull, & Mandy, 2017; Sturge, 2018) this limits the applicability of these findings to female offenders. Future research could conduct similar research including female autistic offenders to see whether there are any differences given the reported differences between males and females diagnosed with ASD with relation to

symptom presentation (e.g., females may be better than males at masking their difficulties; Baldwin & Costley, 2016; Bargiela, Steward, & Mady, 2016; Cridland, Jones, Caputi, & Magee, 2014).

Regarding the groups included within Chapters Two and Three, the offenders were grouped together (i.e., offenders, non-offenders) rather than the offences being considered separately (e.g., sexual offence, violent offences). Whilst this method is frequently used in the literature and reaching the required number of offenders required for adequate power would have been virtually impossible within the timeframe of this PhD, future research could benefit from gaining adequate data from separate offence classifications. For example, research with autistic offenders has previous found differences in substance abuse disorder between autistic violent offenders, autistic non-violent offenders and autistic sexual offenders (Långström et al., 2009; Søndenaa et al., 2014). Obtaining data from each offence type could also help to explain the identified the heterogeneity in ASD characteristics observed in autistic offenders (Murphy, 2007).

In hindsight, the studies could have been run in a different order for optimum results. In future, if research adopts the approach of looking at each of the offence classifications separately, it would be beneficial to conduct interviews with each group of offenders to identify the reasons that they believe that they offended. Helverschou et al. (2018) highlighted the different perspectives between autistic offenders and professionals with regards to explanations for offending behaviour. For example, all of the professionals thought rigidity was involved in the offending behaviours whereas none of the autistic offenders reported this. Therefore, a more participatory approach to the design of future research may shed light on both reasons for offending and discrepancies between autistic offenders and professionals (Fletcher-Watson et al., 2018). This information could then be combined with previous literature to inform which quantitative assessments to select. In addition, it may also

be beneficial to conduct interviews with individuals who know the offender well to see whether they have a different understanding as to why the individual engaged in the offending behaviours.

Including variables which require an element of memory such as those in Chapter Two may also be a limitation to this study. It is possible that the offenders may not have remembered events experienced as a child and accidentally answered incorrectly. For example, autistic individuals have been reported to have autobiographical and episodic memory deficits (Crane & Goddard, 2008; Crane, Pring, Jukes, & Goddard, 2012). This could be overcome by either involving the family of the individual, professionals who knows the offender well or by gaining access to relevant notes. However, the practicalities of this (e.g., offenders may be incarcerated far from home making family contact difficult) and ethics (e.g., is it ethical for a researcher to be granted access to the full history of an offender?) must be fully considered.

A final methodological limitation is the medium through which data collection takes place. For example, it would be interesting to conduct interviews with the cyber offenders over the cyber medium (e.g., an instant messaging app) to see whether this impacts upon the quality and quantity of the responses. Within the research presented in Chapter Five, some of the participants (whilst stating that they were happy to engage and/or continue) appeared to be uncomfortable at times. For example, when being interviewed face to face sometimes individuals appeared fidgety or avoided eye contact or during phone interviews there were some quite lengthy pauses at times. Previous research has indicated that communicating using computers and the internet benefits autistic individuals for a number of reasons including increased comprehension and time to think, simple format (i.e., non-verbal cues such as facial expression or tone of voice removed) and reduced stress (Benford & Standen, 2009; Carter et al., 2012; Gillespie-Lynch et al., 2014; Van der Aa et al., 2016). The effect of

conducting interviews using a medium that was more natural or comfortable for the participant could be beneficial to both the experience of the participant and also the quality of the data. Hsu and Teoh (2017) found that interviews conducted with autistic individuals using an avatar resulted in improved memory than those interviewed by a human interviewer. This effect was stronger for autistic participants than TD participants. On the contrary, using this method may also negatively impact the data collection as participants may be more distracted by engaging in multiple activities simultaneously with autistic adults demonstrating impairments in multi-tasking (Hill & Bird, 2006).

6.5. Conclusion

This thesis highlights the importance of using mixed methods for offender research. Previous literature highlights five unique advantages to mixed methods applied offender research which are capitalised upon throughout this thesis: (1) triangulation (i.e., assessing convergence between qualitative and quantitative methods); (2) complementarity (i.e., using one method to elaborate or clarify the results from the other method); (3) initiation (i.e., using one method to identify areas which may have gone unnoticed if only one method was employed); (4) development (i.e., using one method to guide the creation, selection or analysis methods used by the other) ; and (5) expansion (i.e., using multiple methods to answer different elements of the same research question) (Trahan and Stewart, 2013).

Although only a few significant differences were found on the quantitative measures between the autistic offenders and autistic non-offenders (i.e., total OFQ and behavioural conduct score), the identified differences between the autistic offenders and TD participants have practical implications for autistic offenders. For example, this thesis found that social vulnerability is not confined to childhood but rather continues into adulthood for both autistic offenders and autistic non-offenders. This finding highlights the importance of forensic services to assess, monitor and intervene appropriately. This research also helped to dispel

the myth that autistic traits are positively associated with cyber-dependent deviancy and offending and instead identified that autistic traits are significantly positively associated with advanced cyber skills. The implication being that in order to help reduce the predicted 3.5 million unfilled cyber jobs and $6 trillion cost of cybercrime to the global economy (Morgan, 2018) employers need to understand the needs of individuals with high autistic traits. This is in relation to both recruitment and retaining employees to enable successful career progression (e.g., ASD friendly working environments). In addition to the understanding improvements required for employers, it was found that often autistic individuals and those with high AQ traits who engaged in offending (both cyber and sexual) frequently did so due to a lack of understanding (i.e., socially, legally) which highlighted the need for tailored educational packages to be designed and evaluated to address these deficits.

Finally, despite answering many questions about the nature of offending across the autism spectrum, this thesis raised many more. Ultimately, in order to reduce the estimated four times greater prevalence of ASD within forensic settings we need to continue to improve our understanding of this group of offenders in order to develop tailored and effective interventions to both prevent both initial offending and re-offending.

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Appendices

Appendix 1. Offending Factors Questionnaire

Mental Health	Have you previously been diagnosed with a mental disorder (e.g., anxiety, depression, personality disorder)? If yes, please list the diagnoses and whether this diagnosis is still applicable.
	Are you currently prescribed any psychiatric medication (e.g., antipsychotic, antidepressant)?
	Have you previously been prescribed any psychiatric medication (e.g., antipsychotic, antidepressant)?
	Have you previously received support from mental health services?
Family	Were social services ever involved with you/your family during your childhood? If yes , what for?
	Were you placed into the care of social services (e.g., foster placement) during your childhood as a result of the above social service involvement?
	Did your parent(s) or primary care giver experience mental health difficulties?
	Did your parent(s) or primary care giver misuse alcohol?
	Did your parent(s) or primary care giver misuse illegal drugs?
	Were your parent(s) or primary caregiver convicted of any criminal offences?
	Did you observe any violence within the family home?
	Did you experience the death of a parent or primary care giver when you were a child?
	Did you experience parental/primary care giver divorce as a child?
	Did your family suffer extreme financial hardship when you were a child?
Substance Behavioura	Were you bullied by others at school?
	Have you taken illicit drugs?
	Have you frequently excessively drank alcohol?
	Did you bully other people at school?
	Have you ever been physically aggressive to another person?

Have you ever been verbally aggressive to another person?

Have you ever behaved destructively (e.g., breaking things)?

Have you behaved in a sexually inappropriate way?

Are you over-active (e.g. find it hard to sit still, fidget a lot, always moving and on the go)?

Were you ever described as having a tendency to be hyperactive as a child?

Appendix 2. Information and Consent Forms (Studies 1 & 2)

Information Sheet

Title: The role of social vulnerability and compliance in solo/co-offending in Autism Spectrum Disorder (ASD).

Invitation:
We'd like to invite you to take part in our research study. Joining the study is entirely up to you. Before you decide we would like you to understand why the research is being done and what it would involve for you. Katy-Louise Payne is leading this project. She is a PhD student within the department of psychology at the University of Bath. Katy-Louise will go through this information sheet with you, to help you decide whether or not you would like to take part and answer any questions you may have.

We'd suggest the study should take about 75 minutes. Please feel free to talk to others about the study if you wish. The first part of the Participant Information Sheet tells you the purpose of the study and what will happen to you if you take part.

Then we give you more detailed information about the conduct of the study.

Why have I been invited?
You have been invited because this research needs people like you. The research needs four different groups of individuals:

1. Individuals with Autism Spectrum Disorder who have had contact with the Criminal Justice System as an offender
2. Individuals with Autism Spectrum Disorder who have not had contact with the Criminal Justice System as an offender
3. Individuals without Autism Spectrum Disorder who have had contact with the Criminal Justice System as an offender
4. Individuals without Autism Spectrum Disorder who have not had contact with the Criminal Justice System as an offender

The different groups are needed to enable comparisons to be made to identify any differences specific to individuals with ASD who have committed criminal offences.

Purpose of and background to the research
This study aims to better understand how a complex combination of ASD characteristics together with internal and external factors may lead a minority of people with ASD to engage in criminal activities.

If you would like to discuss any aspect of the research, you can contact Katy-Louise Payne by email (k.payne@bath.ac.uk). We would really appreciate your participation, because the outcomes of our study will help to identify specific characteristics that make a minority of individuals with Autism Spectrum Disorder more vulnerable to committing crime.

What would taking part involve?
If you decide to take part, you will first be given the opportunity to ask any questions you may have about the study before being given a consent form (version 3 21/07/2015) to sign. The consent form will be stored separately from the anonymous information you provide for the research project.

During the study you will be asked to complete questionnaires which look at vulnerability, compliance, moral reasoning, social motivation, your understanding of other people's intentions, autism trait score and your verbal and non-verbal ability.

You will also be asked to complete a questionnaire about any offences you may have committed. Please do not provide any new information about illegal activities that you have committed **unless** the police or judicial authorities are already aware of it. If you do provide information that is not already known to the police or judicial authorities, I am under a duty to report these matters to the police. Otherwise everything you report will be confidential.

The final questionnaire you will be asked to complete is a short questionnaire that will ask about your medical, educational and social history.

In order to answer all of the questions within the expected 75 minutes it is important to answer each question swiftly. Do not rush and ensure that you have read the question properly before answering, but please try to answer using your first inclination without too much deliberation.

The questionnaires will be completed by you (the participant) under the guidance of Katy-Louise Payne within a quiet and appropriate room either within your current place of residence (e.g. if within hospital/prison environment) or at the University of Bath or other appropriate location on a prior decided date/time.

What will happen to the results of the study?

Nobody except the project team will be allowed to see your questionnaires and in the study you will be known only by a number. So the information you provide is completely confidential and there will be no way for anyone outside of the project team to identify you or the information you provide.

Due to the organisation funding this PhD (ESRC), the researcher is strongly encouraged to submit the anonymised findings to the UK Data Service; however if you do not want your data to be included within this you can indicate this on the consent form (version 3 dated 21/07/2015) and your results will be completely removed from the file before it is sent. This will not impact on your care and treatment in any way.

You do not have to take part in this study if you don't want to. If you decide to take part you may withdraw at any time without having to give a reason. Your decision whether to take part or not will not affect your treatment, care or sentence in any way.

Who has reviewed this study?
This project has received full ethical approval from the NHS Research Ethics Committee Wales (Wales REC 6) (reference number: 15/WA/0214) and the University of Bath Psychological Research Ethics Committee (reference number: 15-026).

What to do if you experience any issues?

If you experience any issues as a result of this study there is someone you can talk to. For individuals within hospital or prison settings, please speak to someone involved within your care that you feel comfortable explaining/discussing the issues you are experiencing. For individuals not in hospital/prison settings please contact one of the following organisations who will be able to offer you advice and/or support:

Samaritans: 08457 909090

Mind**:** 0300 123 3393

What to do if you have a complaint?

If you have a concern about any aspect of this study, you should contact Katy-Louise Payne by phone ([redacted]) or by email (K.Payne@bath.ac.uk) and she will do her best to answer your questions. If you remain unhappy and wish to complain formally, you can do this by contacting Lisa Austin, who is the research manager for the University of Bath's research and development. Lisa can be contacted by phone ([redacted]) or by email (L.Austin@bath.ac.uk).

CONSENT FORM

You have been asked to participate in a study into Autism Spectrum Disorders (ASD) and offending, which is being carried out by Katy-Louise Payne. Please answer the following questions by circling yes or no:

I confirm that I have read the information sheet dated 21/07/2015 (version 3) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	Yes	No
I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected.	Yes	No
Do you agree to take part in the study?	Yes	No
Do you agree to your fully anonymised study data being included in the file submitted to the UK data service (this will not affect you care/treatment/sentence if applicable)	Yes	No

Participant Signature: _____

Name in block letters: _____

Date: _____

NB: This consent form will be stored separately from the anonymous information you provide

Name of researcher obtaining/receiving consent:

Researcher signature: _____.

Date _____

Appendix 3. Lone/Co-offending Questionnaire

1. Have you ever been convicted of a crime? Yes No

   (If yes go to question 2. If no, no further information is required within this specific questionnaire. Please continue with the final questionnaire in the pack)

2. Have you ever been sentenced to time in prison or a psychiatric hospital? Yes No

Please answer the next 13 questions only with reference to the crime for which you were **most recently** convicted?

1.	What crime were you convicted of? ……..		
2.	How long was your sentence? ……..		
3.	How much of your sentence did you serve? (years, months) ……..		
4.	Did you commit the crime alone or with another person(s)? (if committed with other person(s), continue to question 5. If alone, continue to question 13)	Alone	With other
5.	Was the other person with you at the time and scene of the crime?	Yes	No
6.	Did somebody ask you to commit the crime?	Yes	No
7.	Did anybody suggest that you committed the crime?	Yes	No
8.	Did anybody encourage you to commit the crime?	Yes	No
9.	Did anybody tell you to commit the crime?	Yes	No
If you answered yes to any of questions 6, 7, 8 or 9 please go to question 10. If you answered no to <u>all</u> questions 6, 7, 8 or 9 but committed the offence with another person please go to question 10.			
10.	Did you know them?	Yes	No
11.	How long had you known them? (In approximate years and/or months) ……..		
12.	How did you know the person (e.g. friend, family)? ……..		
13.	Is this the first criminal act that you have committed that has resulted in the police and law being involved? If no, please continue with the questionnaire. If yes, no further information is required from you in this questionnaire	Yes	No

If you have other previous convictions please continue with this questionnaire. If you do not, no further information is required from you in this specific questionnaire. Please continue to the next questionnaire.

Please would you be able to complete the following 12 questions for **each** conviction that you have. Please state the offence for which you were convicted before each question set.

Conviction 2

1.	What offence were you convicted of? ……		
2.	How long was your sentence? ……		
3.	How much of your sentence did you serve? (years, months) ……		
4.	Did you commit the crime alone or with another person(s)? If committed with other person(s), continue to question 5. If alone, conviction 2 section is complete. If you have other previous convictions please continue to conviction 3.	Alone	With other
5.	Was the other person with you at the time and scene of the crime?	Yes	No
6.	Did somebody ask you to commit the crime?	Yes	No
7.	Did anybody suggest that you committed the crime?	Yes	No
8.	Did anybody encourage you to commit the crime?	Yes	No
9.	Did anybody tell you to commit the crime?	Yes	No
If you answered yes to any of questions 6, 7, 8 or 9 please go to question 10. If you answered no to <u>all</u> questions 6, 7, 8 or 9 but <u>committed the offence with another</u> person please go to question 10.			
10.	Did you know them?	Yes	No
11.	How long had you known them? (In approximate years and/or months) ……		
12.	How did you know the person (e.g. friend, family)? ……		

If you have other previous convictions please continue with this questionnaire. If you do not, no further information is required from you within this specific questionnaire. Please continue to the next questionnaire.

Appendix 4. Sexual-offender semi-structured interview schedule

1. Do you consent to me recording this interview?
2. Can you explain to me, in your own words, why you think that you committed the crime?
3. What was the main reason that you committed the crime?
    a. Are there any other reasons you think may have influenced you to commit the crime?
    b. Are these additional reasons equally important or less important?
4. Did you have the diagnosis at the time of committing the offence?
    a. Did you feel comfortable with the diagnosis?
5. Do you think your ASD diagnosis played a part in your offending?
    a. Why do you think this?
    b. What specifically about your autism do you think influenced your offending behaviour?
6. Did you plan the crime?
    a. Approximately how long did you plan it for?
    b. Was it your idea?
7. Was anybody else involved in the crime (either in the planning or execution of the crime)?
    a. How many other people were involved?
    b. Whose idea was it to commit the crime?
    c. What was your role(s)?
    d. What role(s) did the other person play?
    e. Did anyone put pressure on you to commit the crime or conduct the role that you did?
8. Was the offence committed under the influence of a substance (e.g., drugs, alcohol)?
9. Did you know at the time of committing the crime that what you were about to do was illegal?
    a. Can you tell me a little more about your understanding prior to committing the crime?

Appendix 5. Information and consent forms (study 3)

Information Sheet

Autism Spectrum Disorder (ASD) and Offending

This study is looking at the characteristics of Autism Spectrum Disorder (ASD) to identify whether any may lead an individual with ASD to commit crime. The project is being led by Katy-Louise Payne, who is a PhD student in the department of Psychology at the University of Bath, under the supervision of Dr Katie Maras, Dr Ailsa Russell and Dr Mark Brosnan. We would really appreciate your participation, because the outcomes of our study will help to identify specific characteristics that make some individuals with ASD more vulnerable to committing crime.

If, special interests, your understanding of other people's intentions, autism trait you decide to take part, you will be asked to complete two tasks. The first task will be to complete questionnaires which look at vulnerability, compliance, moral reasoning, social motivation score and your verbal and non-verbal ability. You will also be asked to complete a questionnaire about any offences you may have committed. Please do not provide any new information about illegal activities that you have committed but the judicial authorities are unaware of; if you do, I am under a duty to report these matters to the police. Otherwise everything you report will be confidential. The last questionnaire you will be asked to complete is a short questionnaire that will ask about your medical, educational and social history. The second task of the study will ask you about why you think that you committed the crime(s). Your answers to this section will be recorded on an encrypted and password protected voice recorder to ensure that your data are securely protected. This recording will be deleted after it has been transcribed and saved in a password protected document. The findings from this research will be used to inform future research which may build on these current findings to look further into the function of ASD in offending and/or apply these findings practically (e.g., risk assessments, interventions).

Nobody except the project team will be allowed to see your data and in the study you will be known only by a number. Thus, the information you provide is completely confidential and there will be no way for people outside of the project team to identify you or the information you provide. If you provide information about behaviour that is against prison rules and can be adjudicated against, illegal acts or behaviour that is potentially harmful to yourself or others, this information is required by the authorities to be disclosed to the appropriate individuals.

There is neither advantage nor disadvantage resulting from your decision to participate or not participate in this research. You are able to refuse to answer individual questions or withdraw from the research at any point and this will not compromise your current situation in any way.

The data from this study is required by the University of Bath regulations to be stored for 10 years. Due to the organisation funding this PhD (ESRC), the researcher is strongly encouraged to submit the anonymised findings to the UK Data Service; however if you do not want your data to be included within this you can indicate this on the consent form and your results will be completely removed from the file before it is sent. This will not impact on your care and treatment in any way.

If you experience any issues (e.g. anxiety or distress) as a result of this study there is someone you can talk to. Please speak to someone involved within your care that you feel comfortable explaining/discussing the issues you are experiencing.

If you wish to request any information, have a query or wish to make a complaint this should be done through your prison establishment or provider.

Please feel free to ask any questions before you complete the consent form, then hand this completed consent form to the researcher. It will be stored separately from the anonymous information you provide for the research project.

CONSENT FORM

You have been asked to participate in a study into Autism Spectrum Disorders (ASD) and offending, which is being carried out by Katy-Louise Payne. Have you (please circle yes or no):

Read the information sheet about the study?	Yes	No
Had an opportunity to ask questions?	Yes	No
Got satisfactory answers to your questions?	Yes	No
Understood that you're free to withdraw from the study at any time, without giving a reason (and without it affecting your care/ treatment/sentence if applicable)?	Yes	No
Do you agree to take part in the study?	Yes	No
Do you consent for task two (i.e., reasons for offending) to be audio recorded on an encrypted and password protected voice recorder?	Yes	No
Do you agree to your study data being included in the file submitted to the UK data service (This will not affect you care/treatment/sentence if applicable)	Yes	No

Signature_____

Name in block letters _____

Date _____

Appendix 6: Norm data scoring for the Informal Test of Social Know How

None of the sample reported a diagnosis of autism spectrum disorder but 16 reported a mental health diagnosis. Diagnoses included depression (n = 9), anxiety (n = 10), OCD (n = 1), anorexia (n = 1), PTSD (n = 1) and borderline personality disorder (n = 1). 81% of the sample grew up in the UK (n = 92).

Question	Fairly normal	Rather strange	Very eccentric	Shocking
1a.	1	0	1	2
1b.	0	1	2	3
1c.	0	1	2	3
2a.	0	1	2	3
2b.	0	0	1	2
3a.	0	1	2	3
3b.	3	2	1	0
4a.	0	1	2	3
4b.	1	0	1	2
4c.	0	1	2	3
5a.	0	1	2	3
5b.	1	0	1	2
6a.	0	1	2	3
6b.	1	0	1	2

6c.	1	0	0	1
6d.	2	1	0	1
7a.	0	1	2	3
7b.	0	1	2	3
8a.	0	1	2	3
8b.	0	0	1	2
8c.	0	0	1	2
8d.	0	0	1	2
8e.	1	0	0	1
8f.	2	1	0	0

Appendix 7: Digital Skills Questionnaire

Digital Skills Questionnaire

Please answer the questions below:

Age: ……

Sex: male female

Course studied (if student), or current job (if appropriate):
……

Have you ever been convicted of a cyber-crime, such as hacking? yes no

If yes, please state crime(s) convicted of:

……

Do you have a diagnosis of an autism spectrum disorder? yes no

Please indicate how true each of the following 10 statements is about you, at this point in time. There are 10 questions that ask about basic digital skills followed by 10 questions that ask about advanced digital skills. There are no right or wrong answers. Please be as honest as you can, and do not miss out any items.

		Not at all true of me	**Not very true of me**	**Neither true nor untrue of me**	**Mostly true of me**	**Very true of me**
1.	I know how to open downloaded files					
2.	I know how to download/save a photo I found online					
3.	I know how to use shortcut keys (e.g. CTRL-C for copy, CTRL-S for save)					
4.	I know how to open a new tab in my browser					
5.	I know how to bookmark a website					

6.	I know where to click to go to a different webpage					
7.	I know how to complete online forms					
8.	I know how to upload files					
9.	I know how to adjust privacy settings					
10.	I know how to connect to a WIFI network					
11.	I understand computer networking (e.g. DHCP, NAT, subnetting)					
12.	I know how to use Linux					
13.	I know how to use a sniffer/protocol analyser (e.g. Wireshark, Tcpdump)					
14.	I know how to use virtualization software packages (e.g. VirtualBox or VMWare workstation)					
15.	I understand security concepts and technologies (e.g. public key infrastructure, secure sockets layer, etc.)					
16.	I understand how encryption algorithms work (e.g. WEP, WPA, WPA2)					
17.	I know how to use one of the scripting					

	languages including the BASH shell (e.g. Perl, Python, Ruby)					
18.	I understand how databases work (e.g. SQL language)					
19.	I know how to build my own website					
20.	I understand details of TCP/IP protocol stack and fields					

The following activities may or may not be illegal, but they can lead to illegal activities. This questionnaire does not ask if you have undertaken these activities for illegal purposes. Rather, please indicate if you have ever undertaken these activities or not:

Phishing: Sending bogus emails asking for security information and personal details	yes	no
Webcam manager: Taking over someone's webcam (without them knowing)	yes	no
File hijacker: Hijacking someone's files (without their permission)	yes	no
Keylogging: Recording what someone types on their keyboard (without them knowing)	yes	no
Screenshot manager: Taking screenshots of someone's computer screen (without them knowing)	yes	no
Ad clicker: Directing someone's computer to click a specific link (without their permission)	yes	no
Hacking: Accessing computer systems without permission	yes	no
Distributed Denial of Service (DDOS): Targeting a computer system to prevent it working	yes	no

Appendix 8: Motivations for engaging or desisting from cyber-dependent offending interview schedule

1. Can you explain to me, in your own words, why you think that you committed the crime?
2. What was the main reason that you committed the crime?
    a. Are there any other reasons you think may have influenced you to commit the crime?
    b. Are these additional reasons equally important or less important?
3. Did you plan the crime?
    a. Approximately how long did you plan it for?
    b. Was it your idea?
4. Was anybody else involved in the crime (either in the planning or execution of the crime)?
    a. How many other people were involved?
    b. Whose idea was it to commit the crime?
    c. What was your role(s)?
    d. What role(s) did the other person play?
    e. Did anyone put pressure on you to commit the crime or conduct the role that you did?
5. Was the offence committed under the influence of a substance (e.g., drugs, alcohol)?
6. Did you know at the time of committing the crime that what you were about to do was illegal?
    a. Can you tell me a little more about your understanding prior to committing the crime?

Please answer the following questions about <u>any</u> criminal encounter you may have had.

7. Have you *ever* been approached to commit a crime online?
8. How did the person approach you (e.g., via game, chat room)?
9. How did they try to convince you to commit the crime?
10. Did you commit the proposed crime?
    a. If yes, why?
    b. If no, what do you think prevented you from engaging in the offence?

Appendix 9. Information and consent forms (study 4)

Information Sheet

Why do some people commit crimes online (e.g., hacking) when others don't?

Before you decide to take part in this study, it is important for you to understand why the research is being done and what it would involve. Please take time to read the following information carefully and discuss it with friends, relatives or your GP if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Background

This study is looking to identify characteristics or combinations of characteristics which lead individuals to commit crimes using the internet/computing services. We would really appreciate your participation, because the outcomes of our study will help to identify specific characteristics that make some individuals commit online offences. Our results may eventually be published in a scientific journal, and may also be reported at scientific meetings. It is hoped that the findings will be used to inform education packages to help prevent individuals from either engaging in illegal activities online or from re-offending.

Procedures

Participation in the study is entirely voluntary. It is up to you to decide whether or not to do this. If you do decide to take part, we would ask you to sign a consent form and give you a copy of this information sheet and the consent form to keep. If you decide to take part you are still free to withdraw from the study at any time up until the data have been analysed and submitted for publication in a scientific journal. If you decide not to take part, or to withdraw, you do not have to give a reason, nobody would be upset.

If you took part, we would ask you to complete five questionnaires looking at your computer skills, general ability, your understanding of everyday situations, your interpersonal support and traits of autism. The final part of the study will be a short series of questions which will ask why you think that you engaged in illegal activity online. The study is expected to take 30-45 minutes to complete. Upon completion of the session we will inform you in more detail about the hypotheses we are testing, and you will have the opportunity to ask further questions. We will reimburse you with a £5 Amazon voucher for your participation.

We do not expect there to be any adverse effects from your participation in the study, but if you feel like you need to speak with someone, please speak to someone you feel comfortable with (i.e., parent, guardian, friend, teacher) or an external organisation. One of the following organisations will be able to offer you advice and/or support:

Samaritans: 08457 909090

Mind: 0300 123 3393

Your data

All data collected in this study will be anonymised. You will be assigned a number. The number and name combinations will be stored within the police station. No data from the study will be stored with your name. You will only be known by a number.

If you have any questions at any time about the study, please do not hesitate to contact Katy-Louise Payne via email (k.payne@bath.ac.uk) or phone ([redacted])

Consent Form: Why do some people commit crimes online (e.g., hacking) when others don't?

Please answer the following questions to the best of your knowledge.

DO YOU CONFIRM THAT YOU:	**YES**	**NO**
• Are 16 years or older	□	□
• Do not have psychosis/psychotic illness, head injury or untreated epilepsy	□	□

HAVE YOU:	**YES**	**NO**
• Been given information explaining about the study?	□	□
• Had an opportunity to ask questions and discuss this study?	□	□
• Received satisfactory answers to all questions you asked?	□	□
• Received enough information about the study for you to make a decision about your participation?	□	□
• Do you consent to the interview being audio recorded? (Offender only)	□	□

DO YOU UNDERSTAND:	**YES**	**NO**
• That you are free to withdraw from the study and free to withdraw your data prior to anonymization at any time	□	□
• Without having to give a reason for withdrawing?	□	□

I hereby fully and freely consent to my participation in this study

- I understand the nature and purpose of the procedures involved in this study. These have been communicated to me on the information sheet accompanying this form.
- I understand and acknowledge that the investigation is designed to promote scientific knowledge and that the University of Bath will use the data I provide for no purpose other than research.
- I understand that the data I provide will be kept **confidential**, and that on completion of the study my data will be **anonymised** by removing all links between my name or other identifying information and my study data. This will be done as soon as you are paid (participant code required for payment for online participation), and before any presentation or publication of my data.
- I understand that the University of Bath may use the data collected for this project in a future research project but that the conditions on this form under which I have provided the data will still apply.

Participant's signature: _____ Date: _____

Name in BLOCK Letters: _____

Final Consent
Having participated in this study

I agree to the University of Bath keeping and processing the data I have provided during the course of this study. I understand that these data will be used only for the purpose(s) set out in the information sheet, and my consent is conditional upon the University complying with its duties and obligations under the Data Protection Act.

Participant's signature: _____ Date: _____

Name in BLOCK Letters: _____

If you have any concerns related to your participation in this study please direct them to the Department of Psychology Research Ethics Committee, via Nathalia Gjersoe Research Ethics Officer (Tel: 01225 38 3251 email: N.Gjersoe@bath.ac.uk).